



## Precision Linear Motion Products Catalog and Design Guide



Leadscrews



Anti-Backlash Nuts



Custom Leadscrew Assemblies



Can-Stack Linear Actuators



Hybrid Linear Actuators



LRS™ Motorized Linear Rail Systems



ScrewRail® Assemblies



RGS® Rapid Guide Screws



Spline Shafts, Slides and Linear Guides

## Hybrid Linear Actuators

Series	Size (square)	Configuration#	Stroke (mm)		Max Force (N)	Travel/step (micron)
			C#	NC / EL#		
21000	21 mm (0.8-in)	C / NC / EL	9 - 38.1	Up to ≈ 200	2 - 44	1.5 - 40
28000	28 mm (1.1-in)	C / NC / EL	12.7 - 63.5	Up to ≈ 250	15 - 90	3 - 50
35000	35 mm (1.4-in)	C / NC / EL	12.7 - 63.5	Up to ≈ 300	50 - 220	1.5 - 50
43000	43 mm (1.7-in)	C / NC / EL	12.7 - 63.5	Up to ≈ 400	100 - 220	1.5 - 50
57000	57 mm (2.3-in)	C / NC / EL	12.7 - 63.5	Up to ≈ 500	300 - 890	4 - 50
87000	87 mm (3.4-in)	C / NC / EL	12.7 - 63.5	Up to ≈ 500	400 - 2224	12.7 - 127

## Double Stack Hybrid Linear Actuators

Series	Size (square)	Configuration#	Stroke (mm)		Max Force (N)	Travel/step (micron)
			C#	NC / EL#		
28000	28 mm (1.1-in)	C / NC / EL	12.7 - 63.5	Up to ≈ 250	30 - 133 <sup>A</sup>	3 - 50
35000	35 mm (1.4-in)	C / NC / EL	12.7 - 63.5	Up to ≈ 300	50 - 220 <sup>A</sup>	15.8 - 127
43000	43 mm (1.7-in)	C / NC / EL	12.7 - 63.5	Up to ≈ 400	50 - 337	15.8 - 127
57000	57 mm (2.3-in)	C / NC / EL	12.7 - 63.5	Up to ≈ 500	150 - 890 <sup>A</sup>	12.7 - 127

<sup>A</sup> Maximum force limited by bearing capabilities.

## Dual Action Actuators

Size (square)	Torque (Ncm)	Linear Stroke (mm)	Max Force	Travel/step (micron)	Load Limits
35 mm (1.4-in)	12.7	Up to 101.6 <sup>†</sup>	50 - 220 N (25 lbs)	3 - 50	133 N (30 lbs)
43 mm (1.7-in)	13	Up to 101.6 <sup>†</sup>	100 - 220 N (50 lbs)	1.5 - 50	222 N (50 lbs)

<sup>†</sup> Standard strokes: 25.4 mm (1-in.), 50.8 mm (2-in.) and 101.6 mm (4-in.).

## Can-Stack Linear Actuators

Series	Ø Size	Configuration#	Stroke (mm)		Max Force (N)	Travel/step (micron)
			C#	NC / EL#		
LC15	15 mm (.59-in)	C	12.7	–	7	20
(Z)20000	20 mm (.79-in)	C / NC / EL	12.7	Up to ≈ 150	3 - 35	25 - 100
(Z)26000	26 mm (1-in)	C / NC / EL	12.7-31	Up to ≈ 150	10 - 80	6 - 100
36000	36 mm (1.4-in)	C / NC / EL	15.5	Up to ≈ 150	15 - 160	3 - 100
46000	46 mm (1.8-in)	C / NC / EL	23.1	Up to ≈ 200	20 - 260	12.7 - 400

# Configurations = Captive / Non-captive / External Linear Lead-screws

## Drives

	Type	Motor Leads	Input Voltage (VDC)	Current/Phase (I)	Number of Microsteps
40105	Chopper	4	20 - 40	2	2
44103	Chopper	4*	24 - 28	1	8
DCS4020	Chopper	4	24 - 40	2	2
DCM8028	Chopper	4 / 6 / 8	20 - 80 <i>E</i>	2.8	256
DCM8055	Chopper	4 / 6 / 8	20 - 80 <i>E</i>	5.5	256

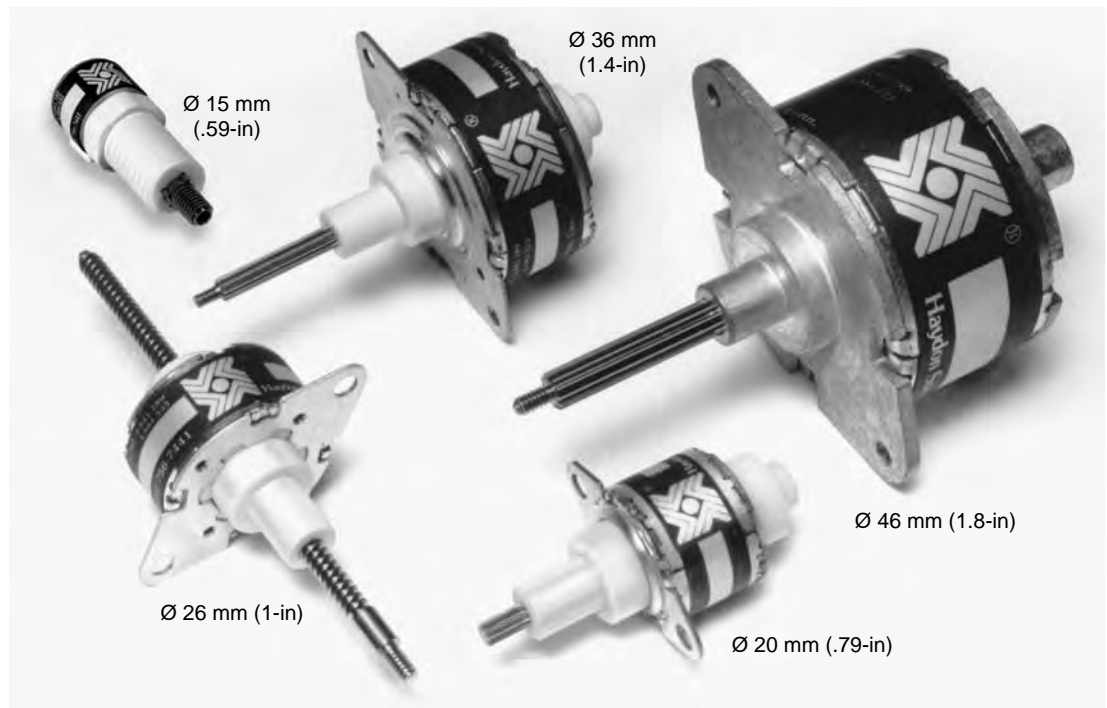
\* 5V motors only. *E* = For Europe – the max. input voltage must be limited to 70 VDC (CE regulations).

**The Haydon™ line of linear actuators provides both a broader range and, for a given size, significantly higher thrust than previously available from mini-steppers**

Four basic frame sizes are available – Ø 20 mm (.79-in), Ø 26 mm (1-in), Ø 36 mm (1.4-in) and Ø 46 mm (1.8-in) – as well as an extremely compact, Ø 15 mm (.59-in) motor (captive shaft only). The basic motors incorporate a threaded rotor in conjunction with a (lead-screw) shaft to provide rapid linear movement in two directions (inward and outward). Available step increments vary with the motor frame sizes and are dependent on the step angle of the motor and the lead screw pitch. A captive or non-captive shaft (lead-screw) option can be supplied for every basic size. Most of the basic sizes also offer an external linear option. The captive shaft configuration features a built-in “anti-rotation” design whereas the non-captive shaft requires the customer to provide external anti-rotation. Both unipolar and bipolar coil configurations are available.

Unique features impart ruggedness and reliability that assure long life and consistent performance. Rare earth magnets are available for even higher thrust. All basic frame sizes are built with dual ball bearings for greater motion control, precise step accuracy and long life.

For finer steps, the High Resolution 26000 and 36000 Series features the smallest step capability in permanent magnet can-stack linear actuators. And, most of the Haydon™ brand motors can also be electronically micro-stepped for tighter controls.



Applications include medical instrumentation, office equipment, machinery automation, robotics, sophisticated pumping systems and other automated devices which require precise remote controlled linear movement in a broad range of temperature environments.

## Identifying the part number codes when ordering Can-Stack linear actuators

<b>E</b>	<b>26</b>	<b>4</b>	<b>4</b>	<b>2</b>	<b>05</b>	<b>900</b>
<b>Prefix</b> (only when using the following)	<b>Series number designation:</b> <b>26 = 26000</b>	<b>Style</b>	<b>Coils</b>	<b>Code ID Resolution Travel/Step</b>	<b>Voltage</b>	<b>Suffix:</b>
<b>E</b> = External <b>P</b> = Proximity Sensor <b>S</b> = Home Switch <b>T</b> = High Temp. <b>N</b> = Nema Flange (46000 Series only) <b>R</b> = Rare Earth Magnet	Available Series: <b>15000</b> <b>20000</b> <b>26000</b> <b>36000</b> <b>46000</b> (Series numbers represent diameters of motor body)	<b>1</b> = 3.75° non-captive <b>2</b> = 3.75° captive <b>3</b> = 7.5° non-captive <b>4</b> = 7.5° captive <b>4</b> = 7.5° cap. Use "E" prefix for "External" <b>5</b> = 15° captive <b>5</b> = 15° cap. Use "E" prefix for "External" <b>8</b> = 15° non-captive	<b>4</b> = Bipolar (4 wire) <b>6</b> = Unipolar (6 wire)	(Example: 2 = travels .002-in per step)  (Refer to travel / step chart found on each Series product page.)	(Example: 05 = 5 VDC; 12 = 12 VDC) Custom V available	<b>Stroke</b> Example: -900 = external linear with grease & flanged nut  <b>Suffix also represents:</b>  -XXX = Special or custom (Special part numbers for custom screw lengths and design options will require an issued 3 digit suffix number. Please contact our sales or applications engineering department for assistance.)

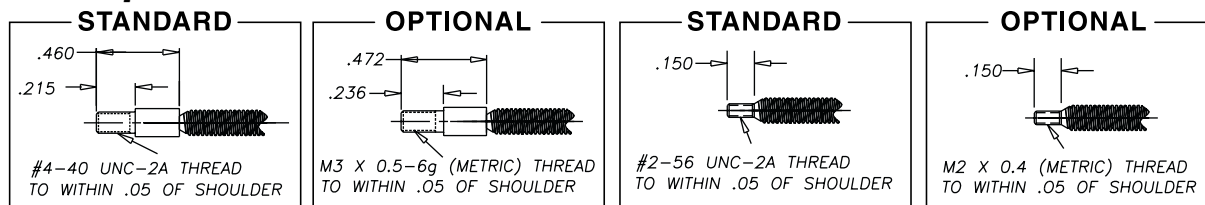
**EXAMPLE:**

**E26442-05-900** = External linear actuator, 26000 series (Ø26 mm, 1-in), 7.5°, bipolar coils, .002-in travel per step, 5 VDC, with grease and flanged nut.

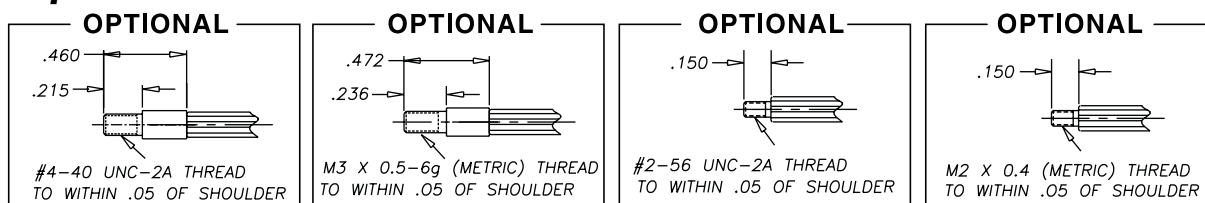
**Screw Length Options:** For non-captive and external linear shaft motors various screw lengths are available to accommodate almost any travel requirement.

### Optional Threaded End Forms for all Z-Series, 20000, 26000 and 36000 Series Motors

#### Non-Captive

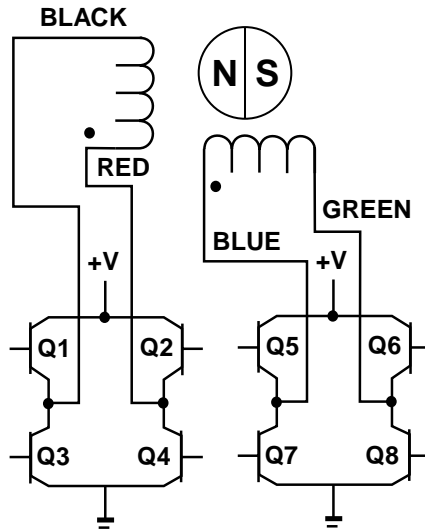


#### Captive

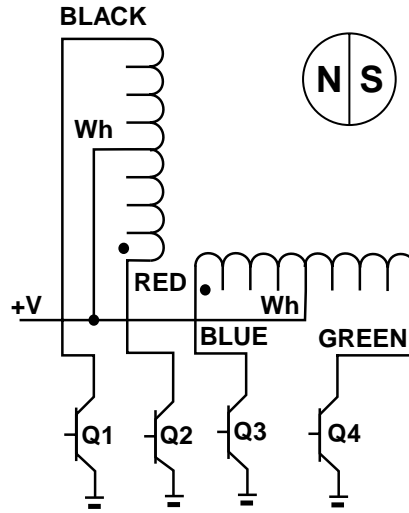


Customized ends and adapters are available for most actuators upon request.

**BIPOLAR**



**UNIPOLAR**



**Can-Stack Linear Actuator: Stepping Sequence**

	Bipolar	Q2-Q3	Q1-Q4	Q6-Q7	Q5-Q8	
	Unipolar	Q1	Q2	Q3	Q4	
	Step					
▼ Extend ▼	1	ON	OFF	ON	OFF	▲ Retract ▲
	2	OFF	ON	ON	OFF	
	3	OFF	ON	OFF	ON	
	4	ON	OFF	OFF	ON	
	5	ON	OFF	ON	OFF	

**Note:** Half stepping is accomplished by inserting an off state between transitioning phases.

# 15000 Series: Ø 15 mm (.59-in) Can-Stack



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## Haydon 15000 Series is the world's smallest commercial linear stepper motor.

The motor features bi-directional travel, ball bearings and a light weight. Available with captive leadscrew only.

### Salient Characteristics

Ø 15 mm (.59-in) motor			
Wiring		Bipolar	
Part No.	Captive	LC1574W-V	
Step angle		18°	
Winding voltage	4 VDC	5 VDC	12 VDC
Current/phase	0.2 A	0.16 A	0.07 A
Resistance/phase	20 Ω	31 Ω	180 Ω
Inductance/phase	5.6 mH	8.7 mH	48.8 mH
Power consumption	1.6 W		
Temperature rise	135°F Rise (75°C Rise)		
Weight	1 oz (28 g)		
Insulation resistance	100 MΩ		
Stroke	0.5-in. (12.7 mm)		

Linear Travel / Step Screw Ø.197"(5.0 mm)		Order Code I.D.
inches	mm	
.00079	.02	W

### Connectors for Series 15000

Standard Connectors Available	JST PHR-4
	12" (304.8 mm) flying leads
	Molex 51021-0400
Other Compatible Connectors	Molex 50-57-9404
	Molex 22-01-3047

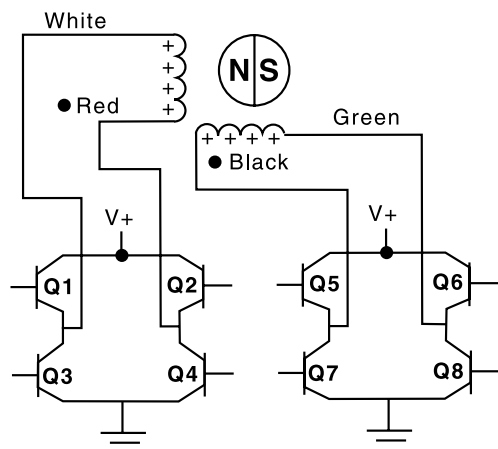
### Flying Leads

Length		Order Code I.D. (add to end on I.D.)
inches	mm	
12.0	304.8	- 999

Special drive considerations may be necessary when leaving shaft fully extended or fully retracted.

**Contact HaydonKerk Motion Solutions™ if external linear version is required.**

### Wiring Diagram

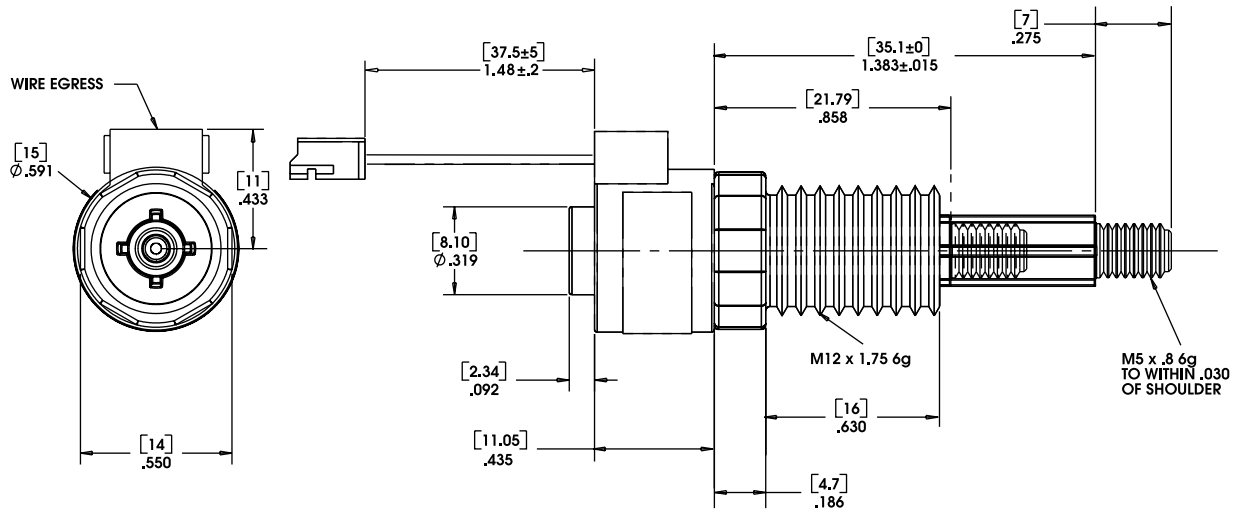


### Stepping Sequence

Bipolar	Q2-Q3	Q1-Q4	Q6-Q7	Q5-Q8
Step				
1	ON	OFF	ON	OFF
2	OFF	ON	ON	OFF
3	OFF	ON	OFF	ON
4	ON	OFF	OFF	ON

Extend
Retract

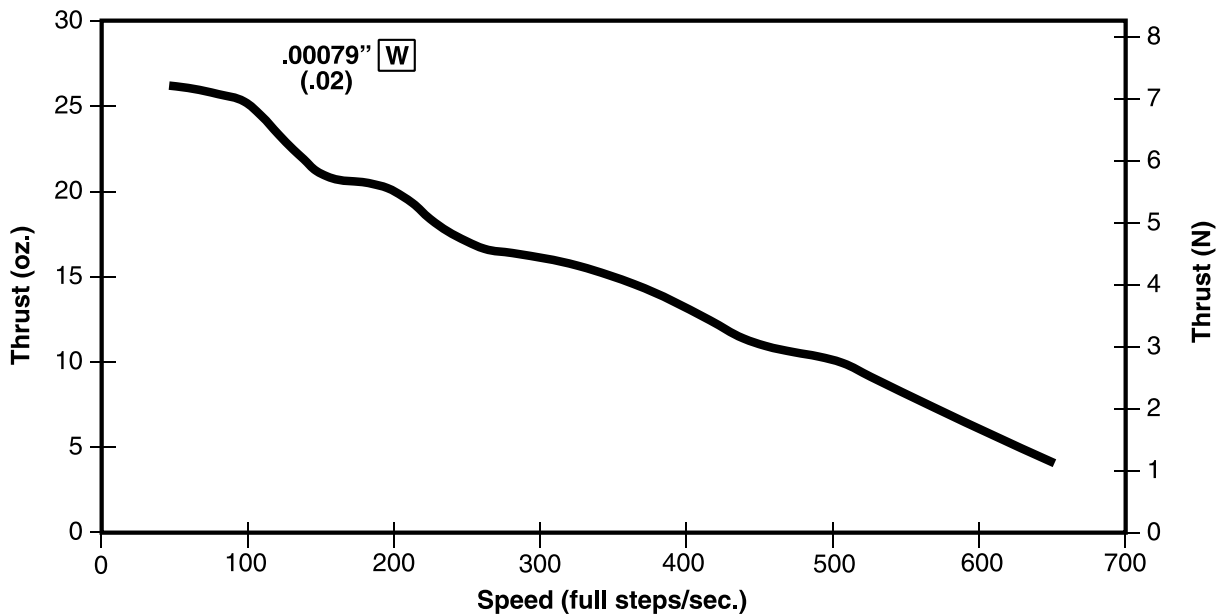
**Captive Shaft (only)**



**15000 Series: Can-Stack Performance Curves**

**THRUST vs. FULL STEPS/SECOND**

L/R Drive • Bipolar • 100% Duty Cycle



## 20000 Series: Ø 20 mm (.79-in) Can-Stack



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### 20000 Series Ø 20 mm (.79-in)

Engineered with unique features reliable long life and performance.



Other basic styles available...

- Teflon® lead-screw
- High Temperature Option

### Salient Characteristics

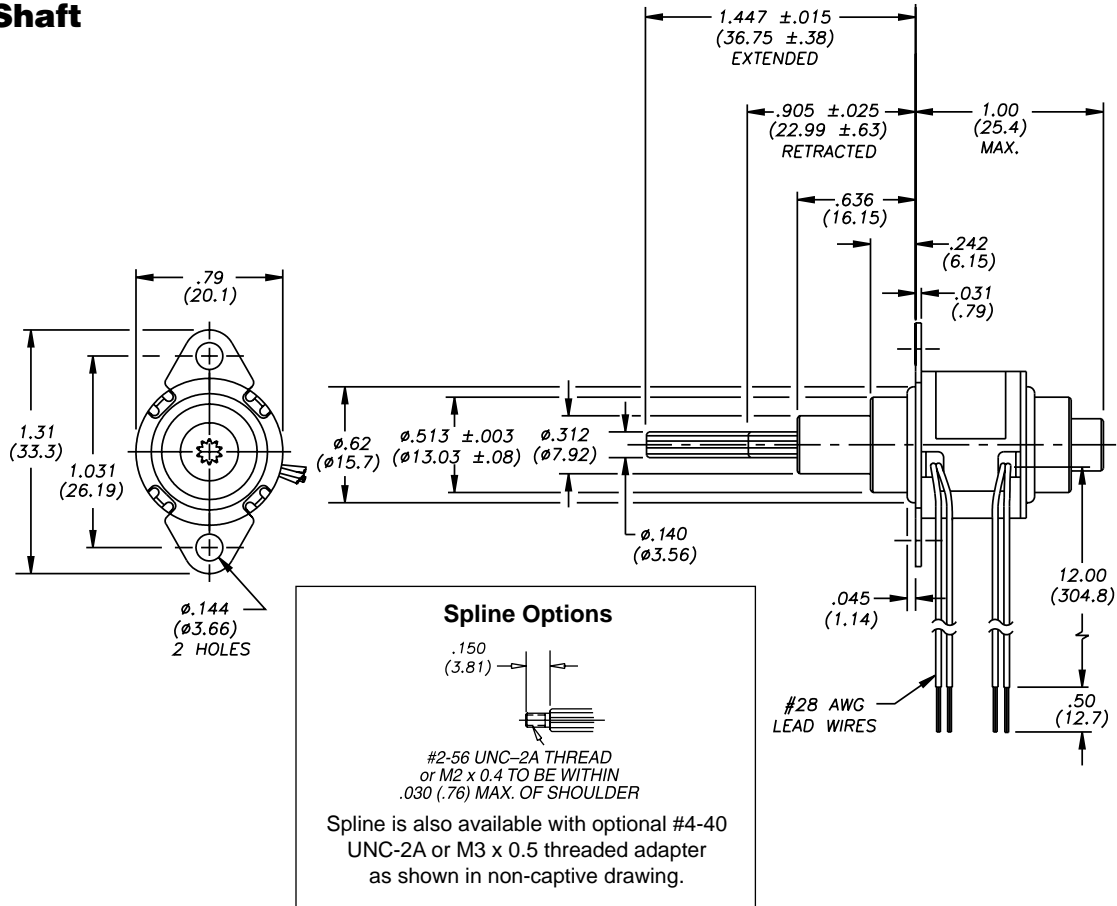
Ø 20 mm (.79") motor		
Wiring		Bipolar
Part No.	Captive	2054X-V
	Non-captive	2084X-V
Step angle		15°
Winding voltage		5 VDC   12 VDC
Current/phase		270 mA   113 mA
Resistance/phase		18.5 Ω   106 Ω
Inductance/phase		5.5 mH   32 mH
Power consumption		2.7 W
Rotor inertia		0.5 gcm <sup>2</sup>
Temperature rise		135°F Rise (75°C Rise)
Weight		1 oz (28 g)
Insulation resistance		20 MΩ

Linear Travel / Step		Order Code I.D.
15° Step Angle		
inches	mm	
0.001	0.0254	1
0.002	0.051	2
0.004	0.102	4

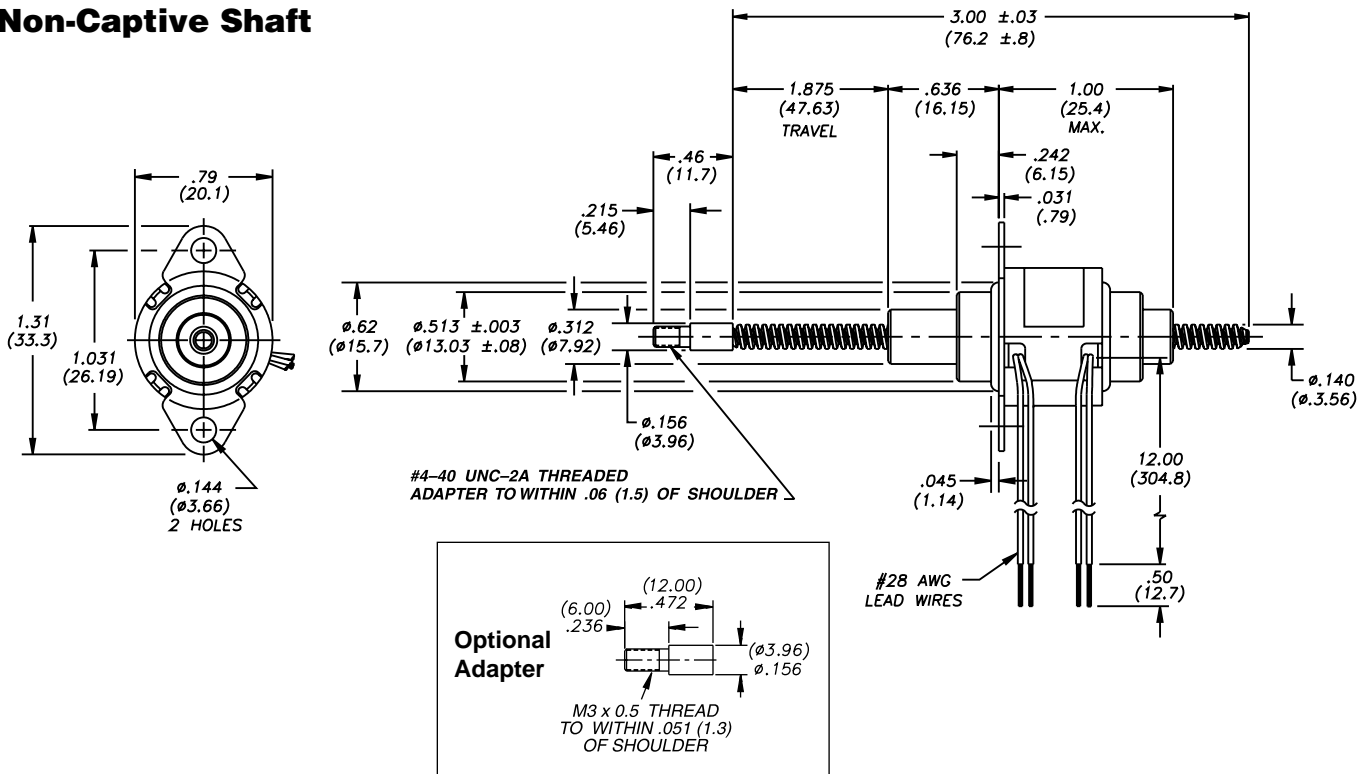
Special drive considerations may be necessary when leaving shaft fully extended or fully retracted.



**Captive Shaft**

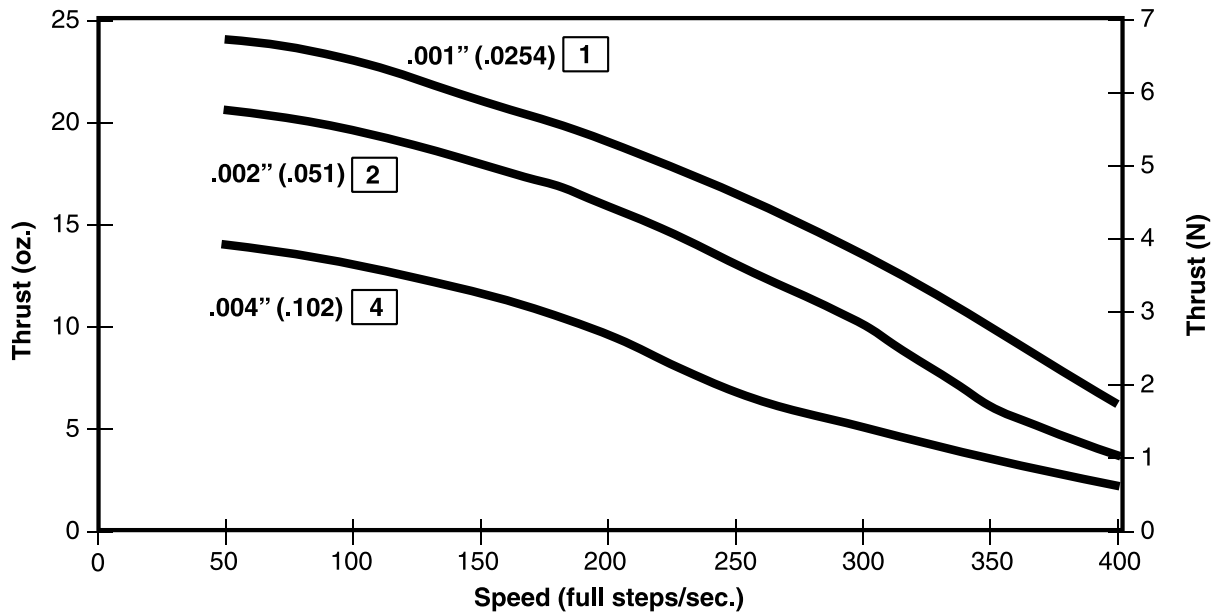


**Non-Captive Shaft**



## THRUST vs. FULL STEPS/SECOND

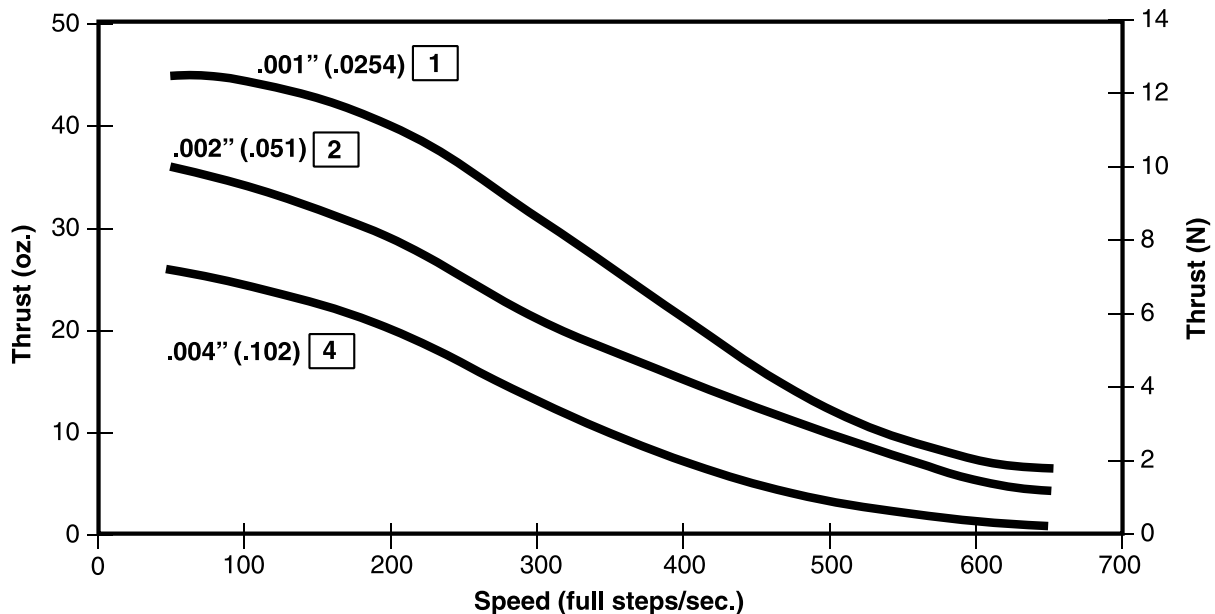
L/R Drive • Bipolar • 100% Duty Cycle



## THRUST vs. FULL STEPS/SECOND

L/R Drive • Bipolar • 25% Duty Cycle

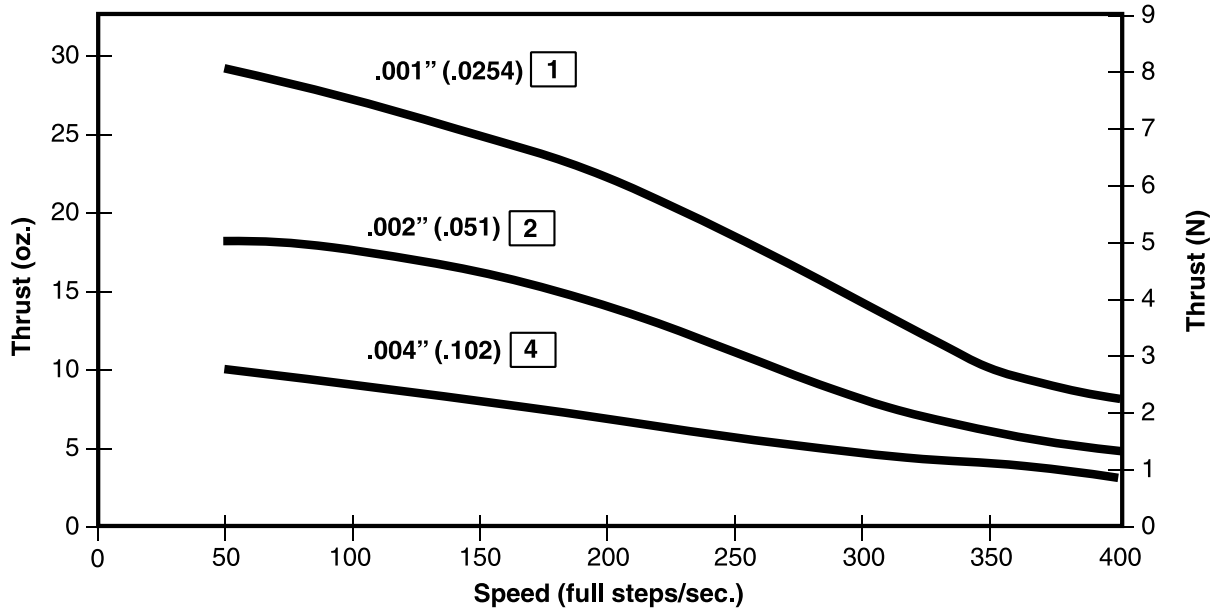
25% duty cycle is obtained by a special winding or by running a standard motor at double the rated voltage.



**NOTE:** Ramping can increase the performance of a motor either by increasing the top speed or getting a heavier load accelerated up to speed faster. Also, deceleration can be used to stop the motor without overshoot.

**THRUST vs. FULL STEPS/SECOND**

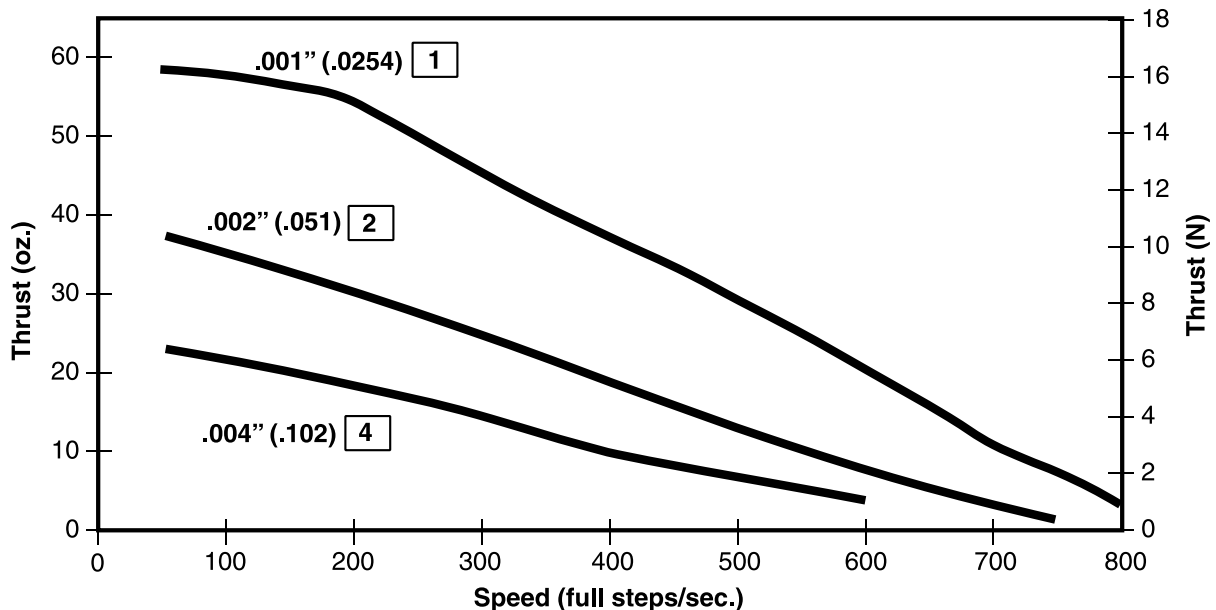
**Chopper Drive • Bipolar • 100% Duty Cycle**



**THRUST vs. FULL STEPS/SECOND**

**Chopper Drive • Bipolar • 25% Duty Cycle**

25% duty cycle is obtained by a special winding or by running a standard motor at double the rated voltage.



**NOTE:** All chopper drive curves were created with a 5 Volt motor and a 40 Volt power supply.

Ramping can increase the performance of a motor either by increasing the top speed or getting a heavier load accelerated up to speed faster. Also, deceleration can be used to stop the motor without overshoot.

# Z20000 Series: Ø 20 mm (.79-in) Can-Stack



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## Z20000 Series economical stepper motors for high volume, applications.

Utilizing rare earth (neodymium) magnets, the Haydon™ Z-Series linear actuators consistently deliver exceptional performance at an economical price. Also available in a special “earless” configuration without a mounting flange, which is ideal for space constrained applications.

Three motors are available... captive, non-captive and external linear. All units are built with reliable dual ball bearings.

### Salient Characteristics

Ø 20 mm (.79-in) Z-Series motor		
Wiring		Bipolar
Part No.	Captive	Z2054X-V
	Non-captive	Z2084X-V
	External*	Z2054X-V*
Step angle		15°
Winding voltage		5 VDC   12 VDC
Current/phase		250 mA   100 mA
Resistance/phase		20 Ω   118 Ω
Inductance/phase		5.4 mH   27 mH
Power consumption		2.5 W
Rotor inertia		1.13 gcm <sup>2</sup>
Temperature rise		135°F Rise (75°C Rise)
Weight		.85 oz. (24.1 g)
Insulation resistance		20 M Ω

Linear Travel / Step		Order Code I.D.
15° Step Angle		
inches	mm	
0.001	0.0254	1
0.002	0.051	2
0.004	0.102	4

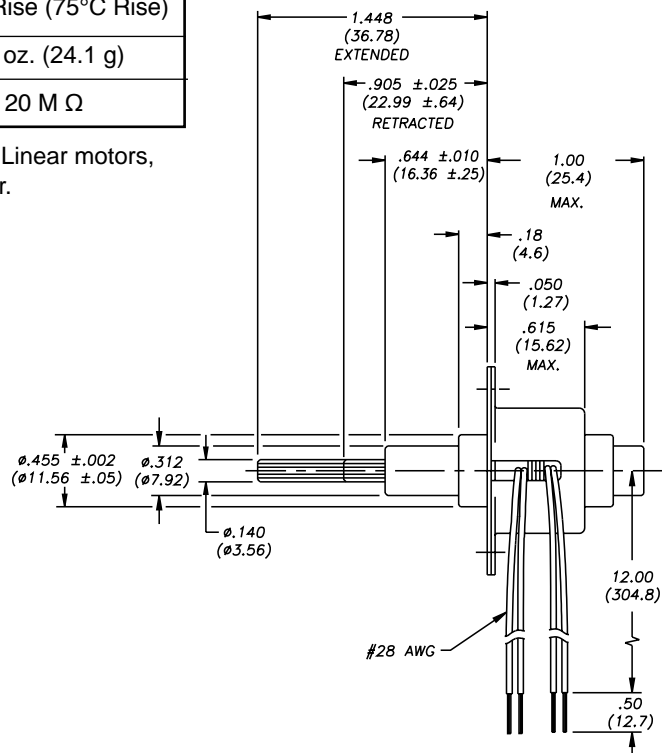
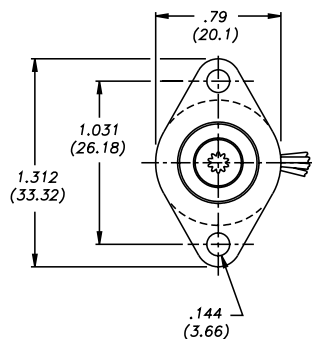
Special drive considerations may be necessary when leaving shaft fully extended or fully retracted.



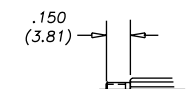
Earless Z20000 Series Actuator

\* When ordering Z-Series External Linear motors, add -900 to end of the Part Number.

### Captive Shaft



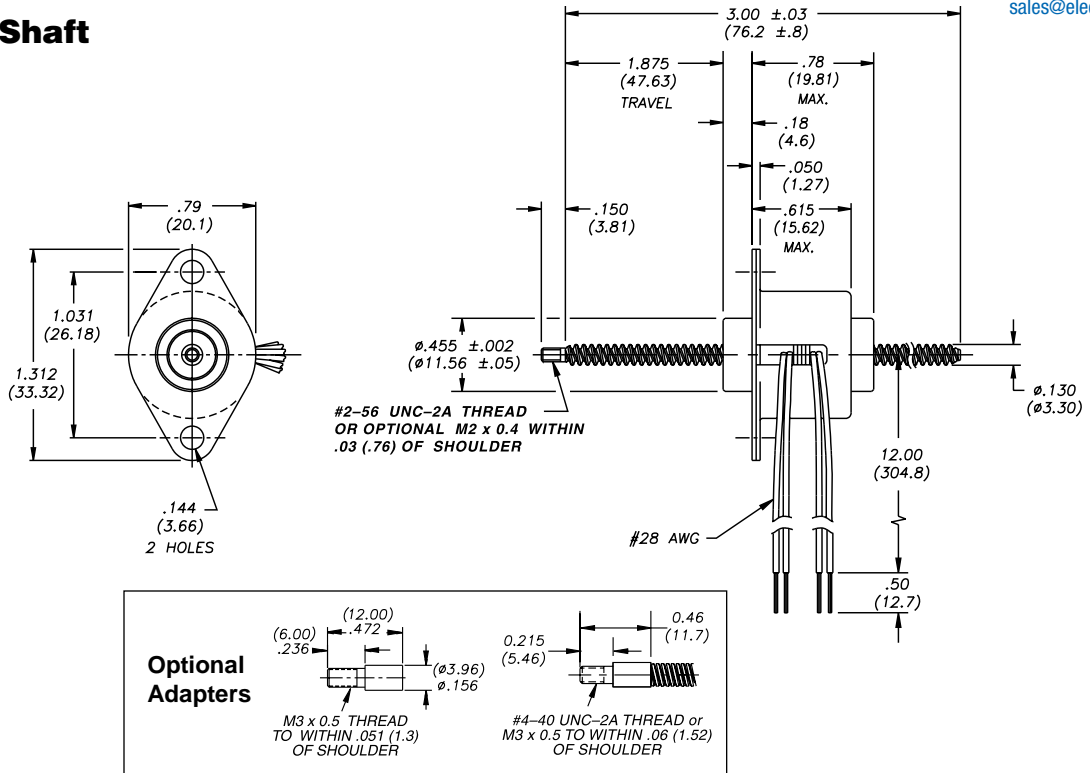
### Spline Options



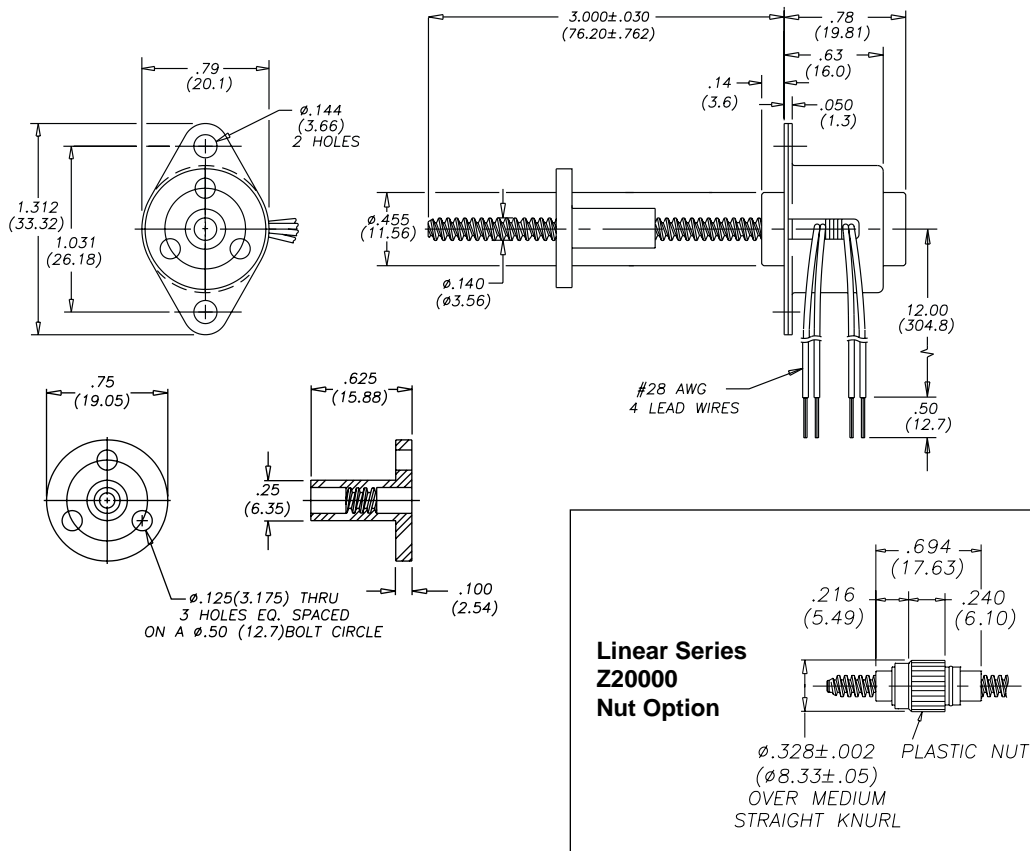
#2-56 UNC-2A THREAD or M2 x 0.4 TO BE WITHIN .030 (.76) MAX. OF SHOULDER

Spline is also available with optional #4-40 UNC-2A or M3 x 0.5 threaded adapter as shown in non-captive drawing.

**Non-Captive Shaft**

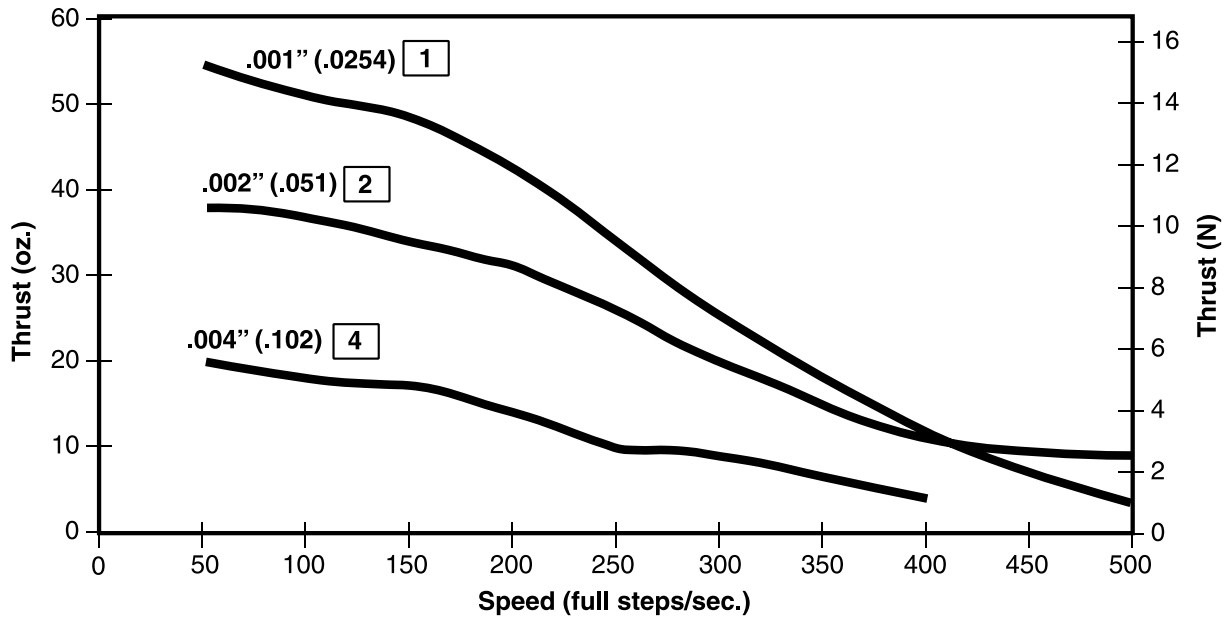


**External Linear**



## THRUST vs. FULL STEPS/SECOND

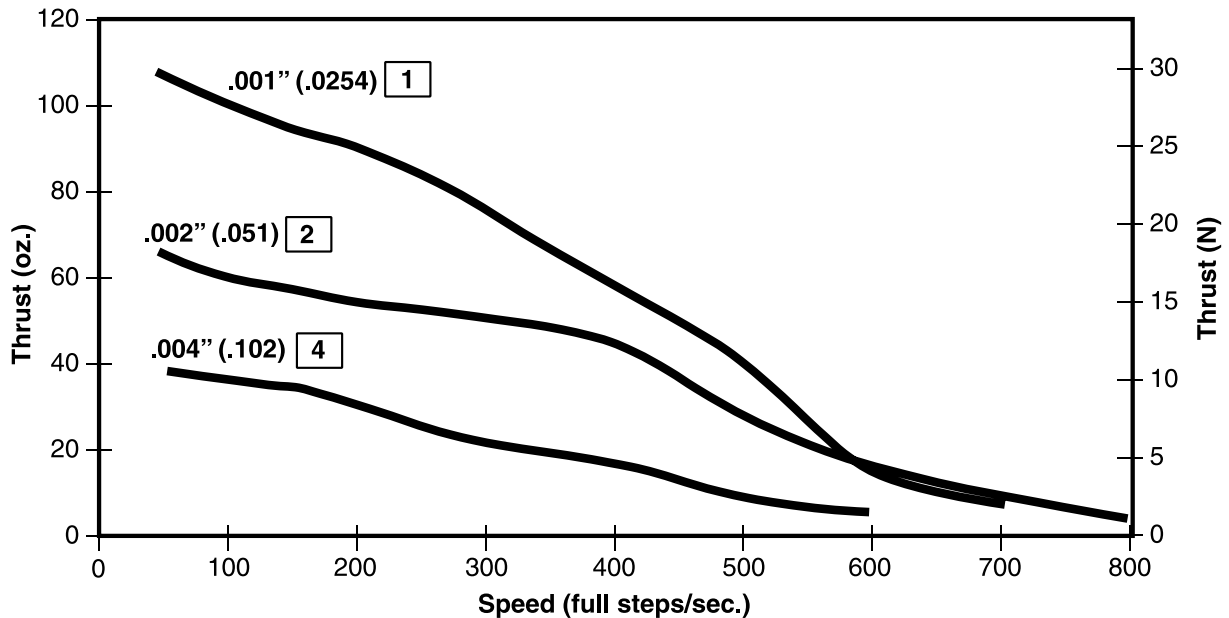
L/R Drive • Bipolar • 100% Duty Cycle



## THRUST vs. FULL STEPS/SECOND

L/R Drive • Bipolar • 25% Duty Cycle

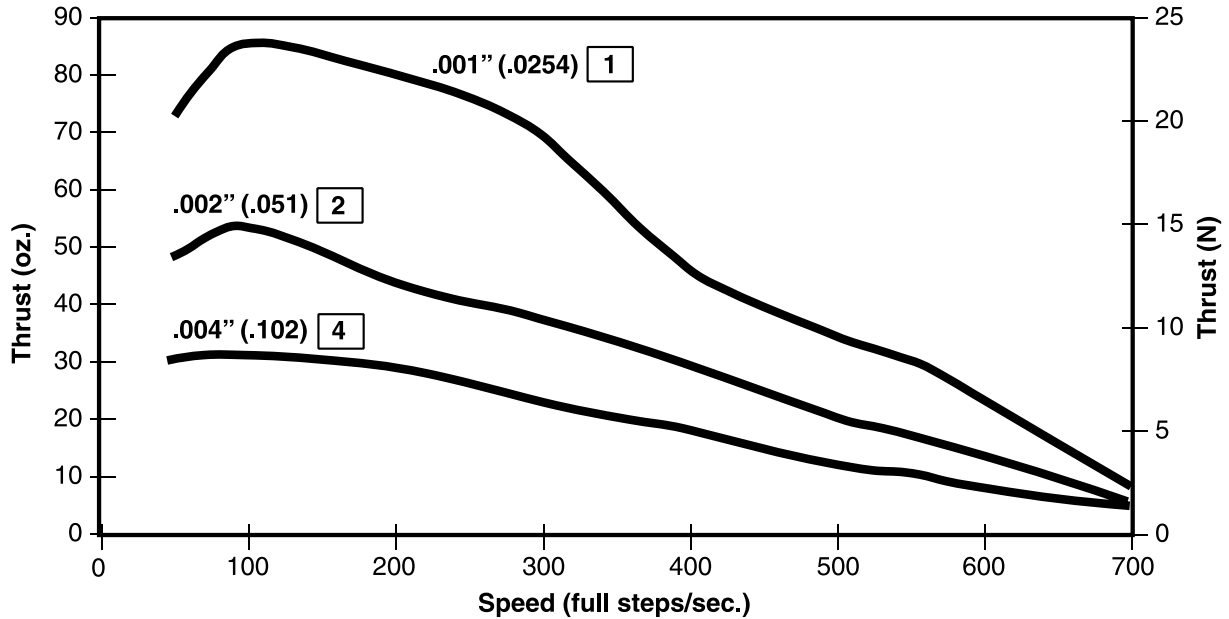
25% duty cycle is obtained by a special winding or by running a standard motor at double the rated voltage.



**NOTE:** Ramping can increase the performance of a motor either by increasing the top speed or getting a heavier load accelerated up to speed faster. Also, deceleration can be used to stop the motor without overshoot.

**THRUST vs. FULL STEPS/SECOND**

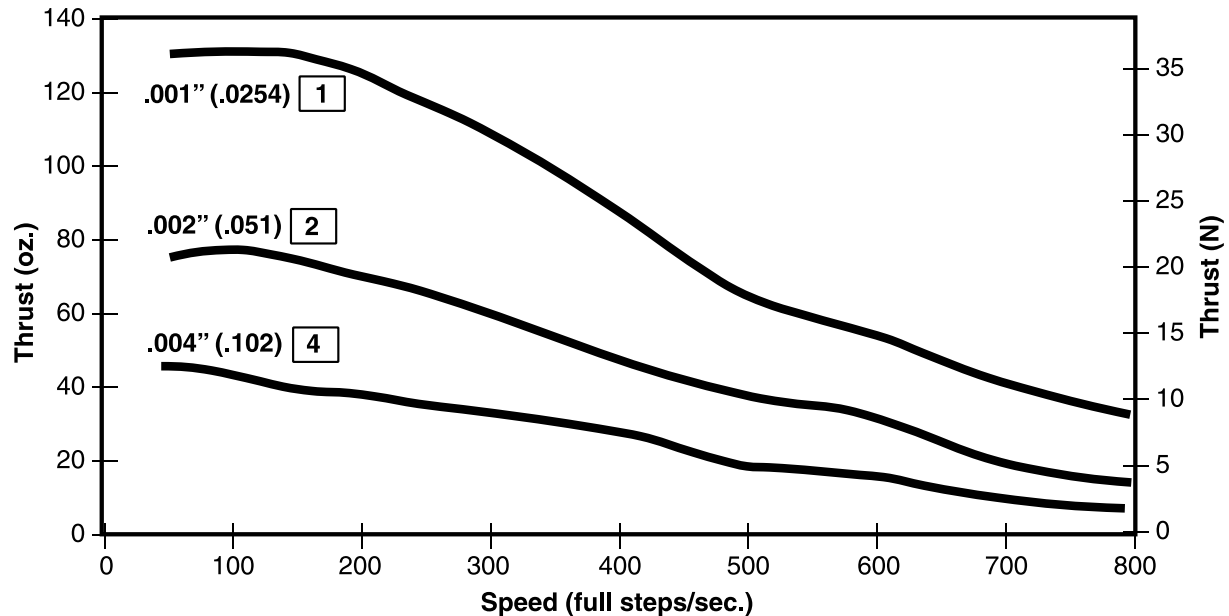
**Chopper Drive • Bipolar • 100% Duty Cycle**



**THRUST vs. FULL STEPS/SECOND**

**Chopper Drive • Bipolar • 25% Duty Cycle**

25% duty cycle is obtained by a special winding or by running a standard motor at double the rated voltage.



**NOTE:** All chopper drive curves were created with a 5 Volt motor and a 40 Volt power supply.

Ramping can increase the performance of a motor either by increasing the top speed or getting a heavier load accelerated up to speed faster. Also, deceleration can be used to stop the motor without overshoot.

# 26000 Series: Ø 26 mm (1-in) Can-Stack



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**An industry standard...  
 high versatility, robust performance.**

## Salient Characteristics

Ø 26 mm (1-in) motor					
Wiring		Bipolar			
Part No.	Captive	2644X-V	2654X-V		
	Non-captive	2634X-V	2684X-V		
	External	E2644X-V	E2654X-V		
Step angle		7.5°		15°	
Winding voltage		5 VDC	12 VDC	5 VDC	12 VDC
Current/phase		340 mA	140 mA	340 mA	140 mA
Resistance/phase		14.7 Ω	84 Ω	14.7 Ω	84 Ω
Inductance/phase		8.5 mH	55 mH	6.7 mH	44 mH
Power consumption		3.4 W			
Rotor inertia		1.2 gcm <sup>2</sup>			
Temperature rise		135°F Rise (75°C Rise)			
Weight		1.2 oz (35 g)			
Insulation resistance		20 MΩ			



Other 26000 Series styles available...

- Z-Series
- High Resolution Series
- Long-Stroke Metric Series
- Teflon® lead-screw
- High Temperature Option

Ø 26 mm (1-in) motor					
Wiring		Unipolar**			
Part No.	Captive	2646X-V	2656X-V		
	Non-captive	2636X-V	2686X-V		
	External	E2646X-V	E2656X-V		
Step angle		7.5°		15°	
Winding voltage		5 VDC	12 VDC	5 VDC	12 VDC
Current/phase		340 mA	140 mA	340 mA	140 mA
Resistance/phase		14.7 Ω	84 Ω	14.7 Ω	84 Ω
Inductance/phase		4.3 mH	24 mH	3.4 mH	19 mH
Power consumption		3.4 W			
Rotor inertia		1.2 gcm <sup>2</sup>			
Temperature rise		135°F Rise (75°C Rise)			
Weight		1.2 oz (35 g)			
Insulation resistance		20 MΩ			

Step	Linear Travel/Step		Order Code I.D.
	inches	mm	
7.5° Angle	0.0005	0.013	3
	0.001	0.0254	1
	0.002	0.051	2
15° Angle	0.001	0.0254	1
	0.002	0.051	2
	0.004	0.102	4

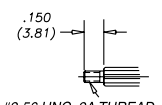
Special drive considerations may be necessary when leaving shaft fully extended or fully retracted.

\* Unipolar drive gives approximately 30% less thrust than bipolar drive.



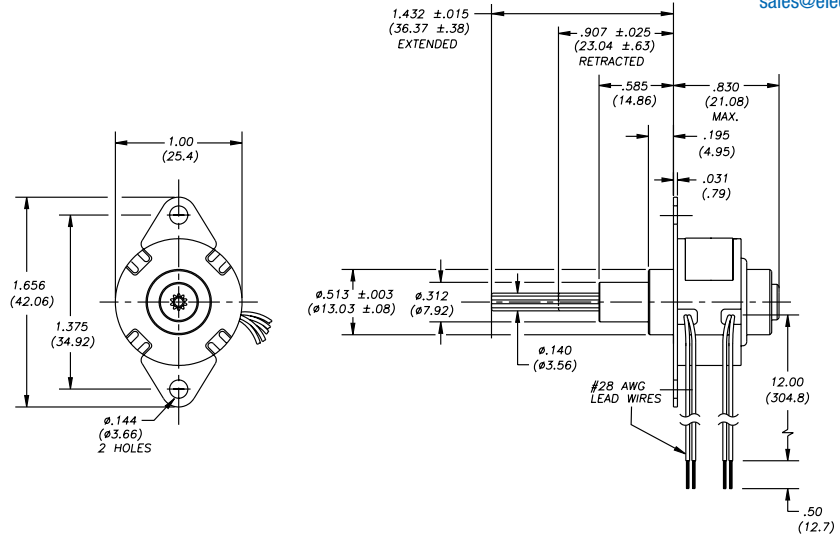
## Captive Leadscrew

**Spline Options**



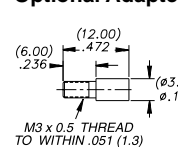
Spline is also available with optional #4-40 UNC-2A or M3 x 0.5 threaded adapter as shown in non-captive drawing.

#2-56 UNC-2A THREAD  
or M2 x 0.4 TO BE WITHIN  
.030 (.76) MAX. OF SHOULDER

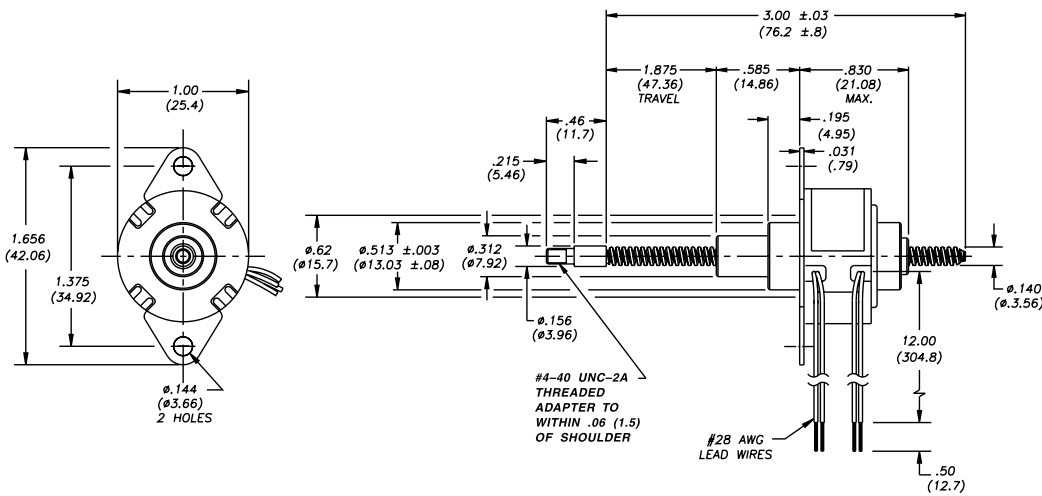


## Non-Captive Leadscrew

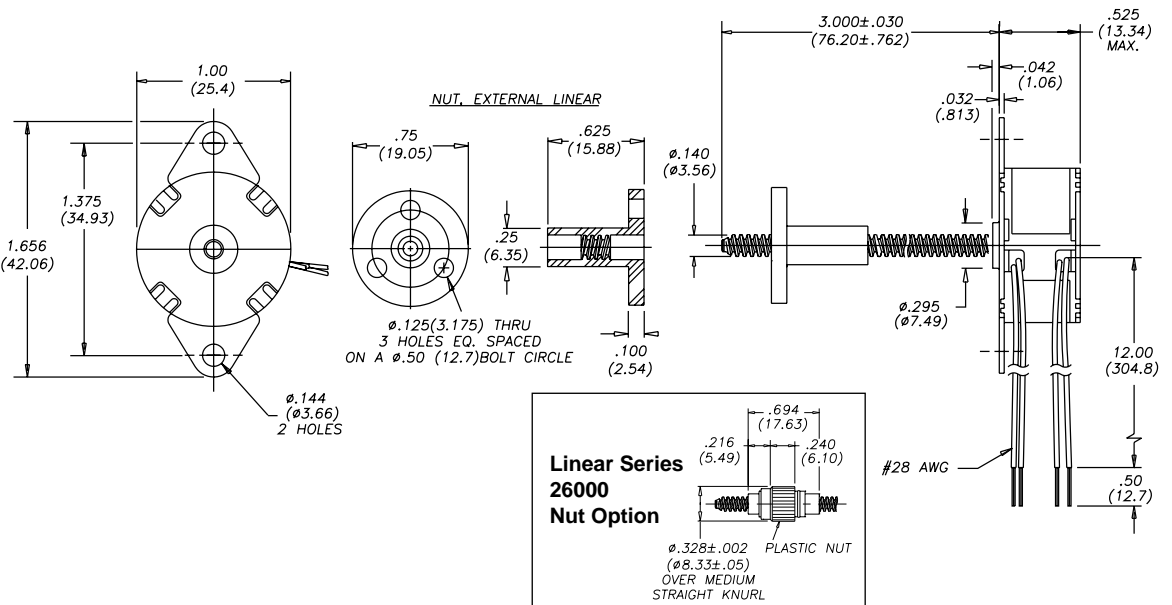
**Optional Adapter**



M3 x 0.5 THREAD  
TO WITHIN .051 (1.3)  
OF SHOULDER

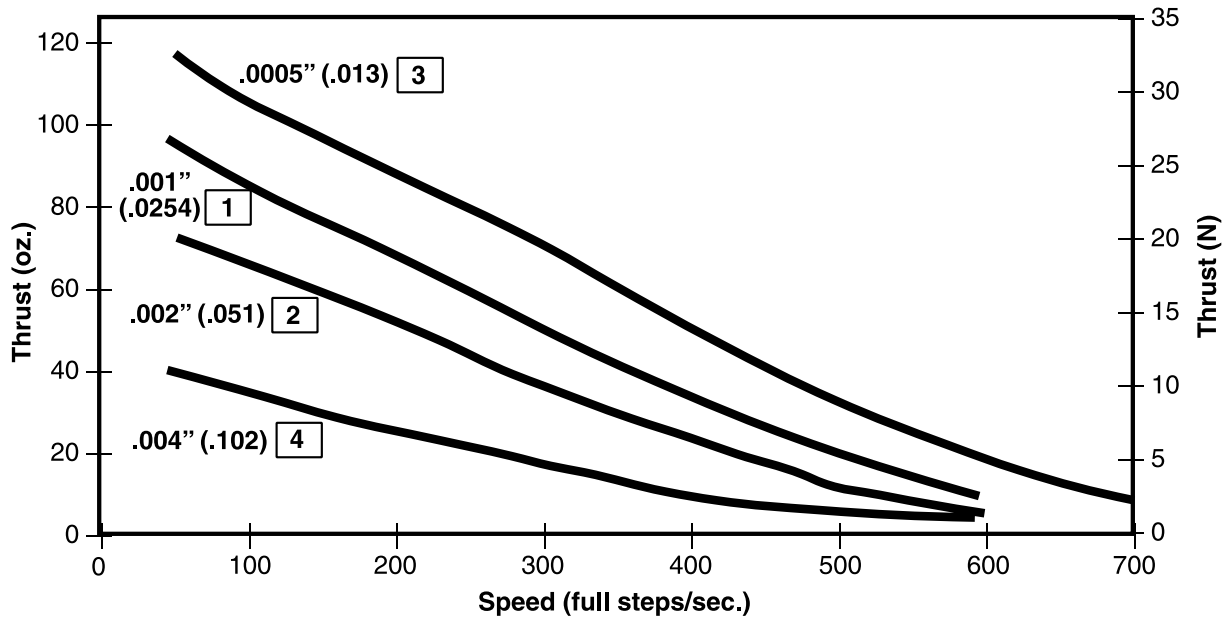


## External Linear



## THRUST vs. FULL STEPS/SECOND

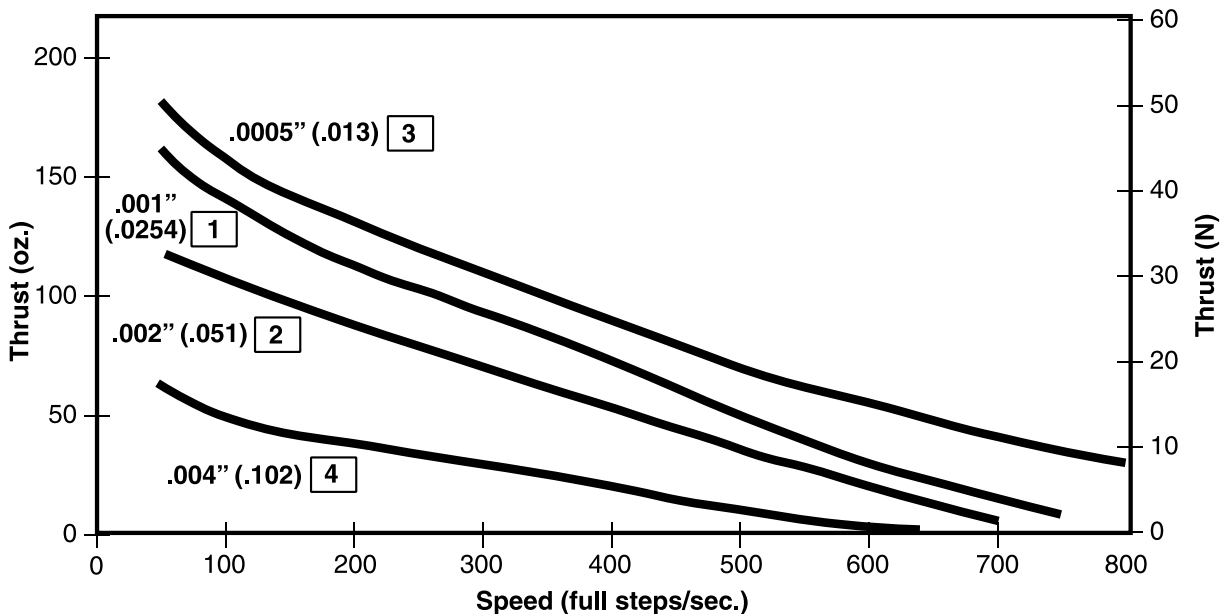
L/R Drive • Bipolar • 100% Duty Cycle



## THRUST vs. FULL STEPS/SECOND

L/R Drive • Bipolar • 25% Duty Cycle

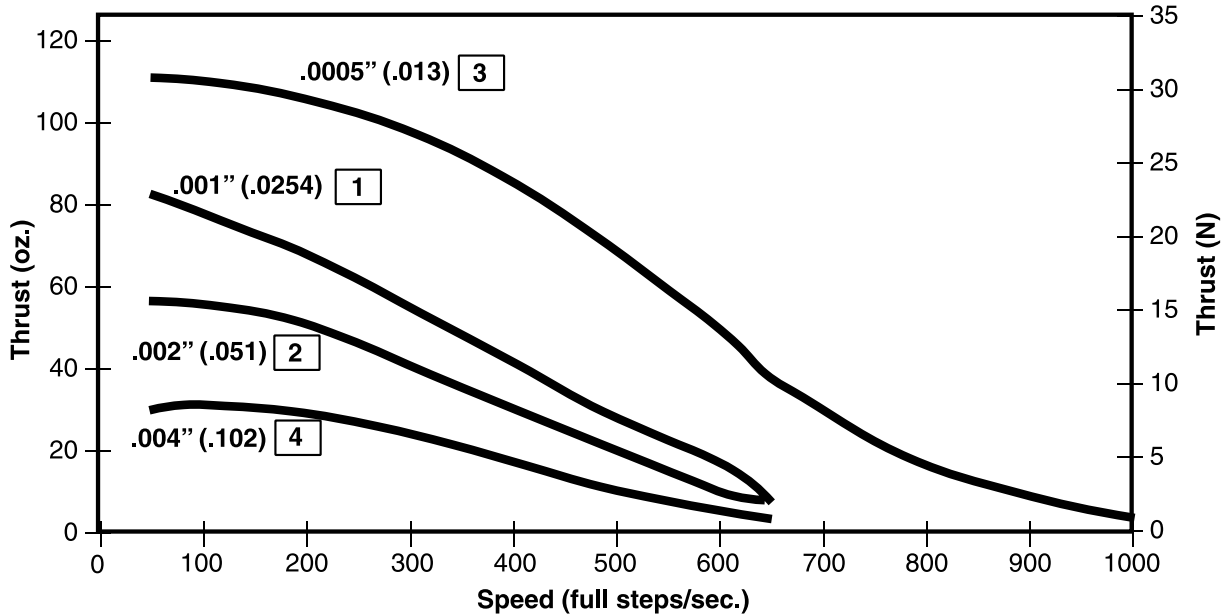
25% duty cycle is obtained by a special winding or by running a standard motor at double the rated voltage.



**NOTE:** Ramping can increase the performance of a motor either by increasing the top speed or getting a heavier load accelerated up to speed faster. Also, deceleration can be used to stop the motor without overshoot.

**THRUST vs. FULL STEPS/SECOND**

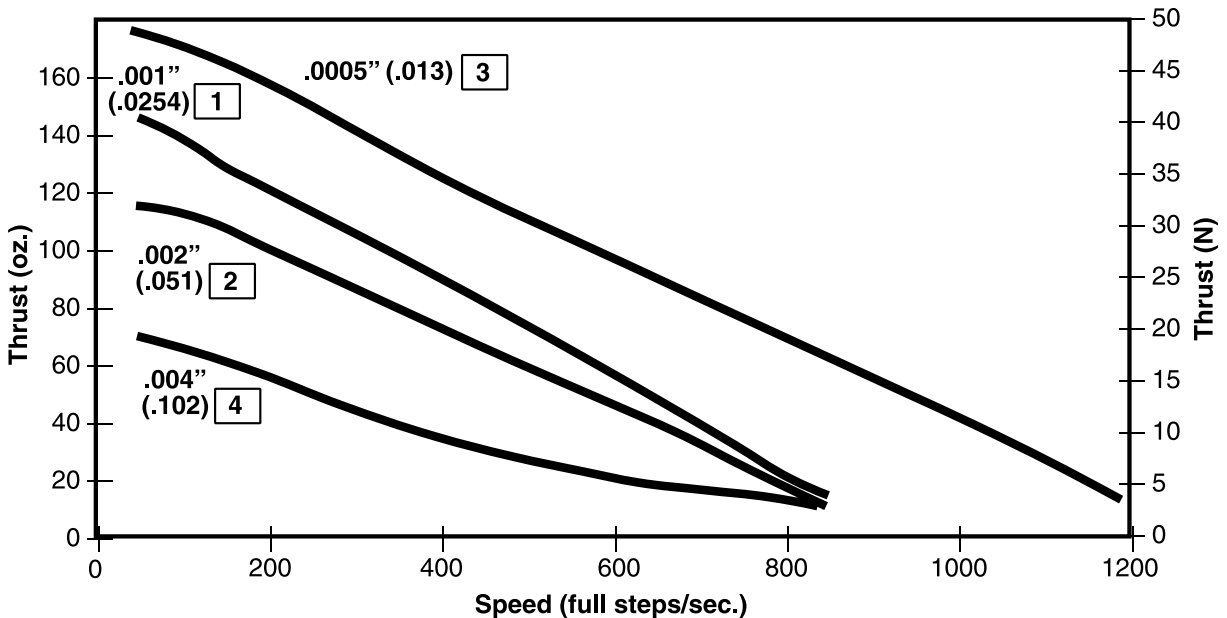
**Chopper Drive • Bipolar • 100% Duty Cycle**



**THRUST vs. FULL STEPS/SECOND**

**Chopper Drive • Bipolar • 25% Duty Cycle**

25% duty cycle is obtained by a special winding or by running a standard motor at double the rated voltage.



**NOTE:** All chopper drive curves were created with a 5 Volt motor and a 40 Volt power supply.

Ramping can increase the performance of a motor either by increasing the top speed or getting a heavier load accelerated up to speed faster. Also, deceleration can be used to stop the motor without overshoot.

# Z26000 Series: Ø 26 mm (1-in) Can-Stack



HaydonKerk Motion Solutions™

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[sales@electromate.com](mailto:sales@electromate.com)

**Exceptional performance at an economical price.**

## Salient Characteristics

Ø 26 mm (1-in) Z-Series motor					
Wiring		Bipolar			
Part No.	Captive	Z2644X-V	Z2654X-V		
	Non-captive	Z2634X-V	Z2684X-V		
	External**	Z2644X-V**	Z2654X-V**		
Step angle		7.5°		15°	
Winding voltage		5 VDC	12 VDC	5 VDC	12 VDC
Current/phase		340 mA	140 mA	340 mA	140 mA
Resistance/phase		14.7 Ω	84 Ω	14.7 Ω	84 Ω
Inductance/phase		8.5 mH	55 mH	6.7 mH	44 mH
Power consumption		3.4 W			
Rotor inertia		1.4 gcm <sup>2</sup>			
Temperature rise		135°F Rise (75°C Rise)			
Weight		1.2 oz (34 g)			
Insulation resistance		20 MΩ			



The Z26000 Series motors are ideal for high volume. Utilizing rare earth (neodymium) magnets. Also, available in a special “earless” configuration without a mounting flange.

All units are built with reliable dual ball bearings.

Ø 26 mm (1-in) Z-Series motor					
Wiring		Unipolar*			
Part No.	Captive	Z2646X-V	Z2656X-V		
	Non-captive	Z2636X-V	Z2686X-V		
	External**	Z2646X-V**	Z2656X-V**		
Step angle		7.5°		15°	
Winding voltage		5 VDC	12 VDC	5 VDC	12 VDC
Current/phase		340 mA	140 mA	340 mA	140 mA
Resistance/phase		14.7 Ω	84 Ω	14.7 Ω	84 Ω
Inductance/phase		4.3 mH	24 mH	3.4 mH	19 mH
Power consumption		3.4 W			
Rotor inertia		1.4 gcm <sup>2</sup>			
Temperature rise		135°F Rise (75°C Rise)			
Weight		1.2 oz (34 g)			
Insulation resistance		20 MΩ			

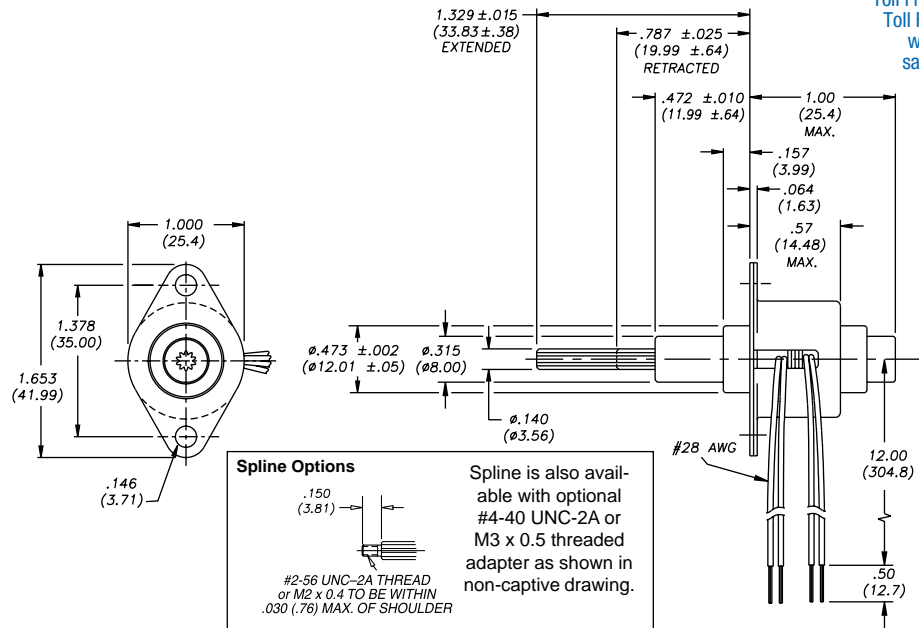
Step	Linear Travel/Step		Order Code I.D.
	inches	mm	
7.5° Angle	0.0005	0.013	3
	0.001	0.0254	1
	0.002	0.051	2
15° Angle	0.00164	0.04166	AS
	0.002	0.051	2
	0.004	0.102	4

Special drive considerations may be necessary when leaving shaft fully extended or fully retracted.

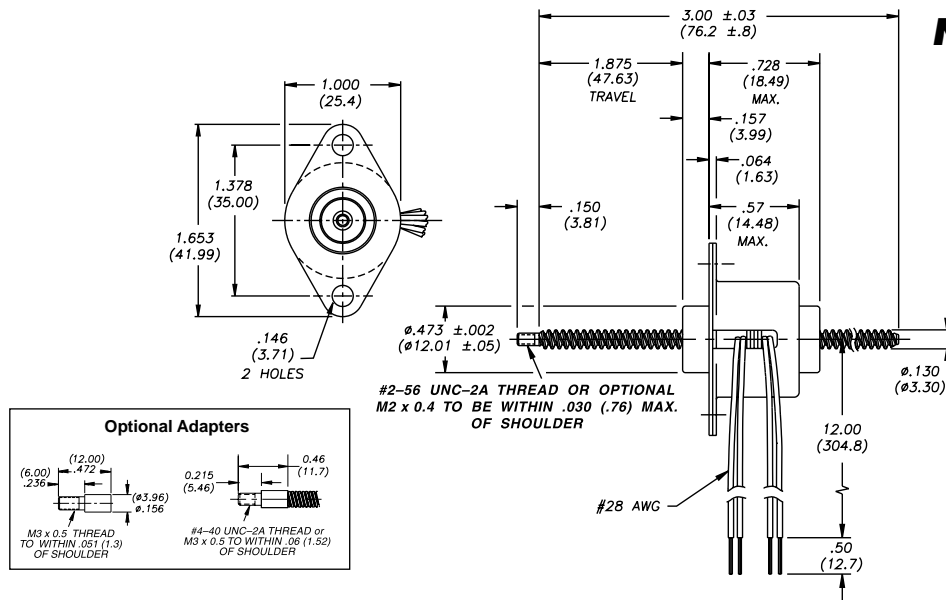
\* Unipolar drive gives approximately 40% less thrust vs. bipolar drive.

\*\* When ordering Z-Series External Linear motors, add -900 to end of the Part Number.

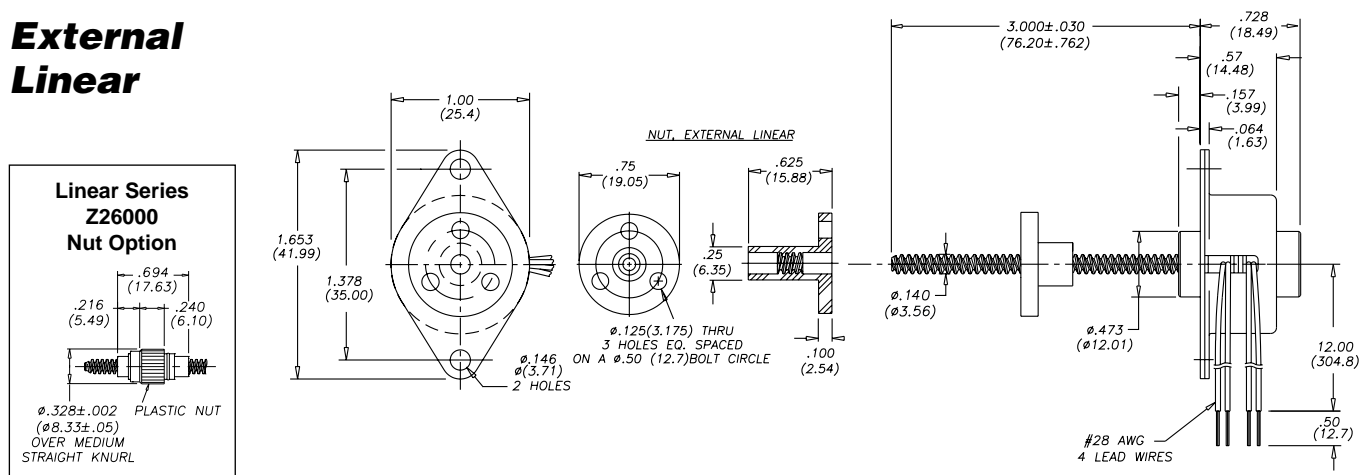
**Captive Leadscrew**



**Non-Captive Leadscrew**



**External Linear**



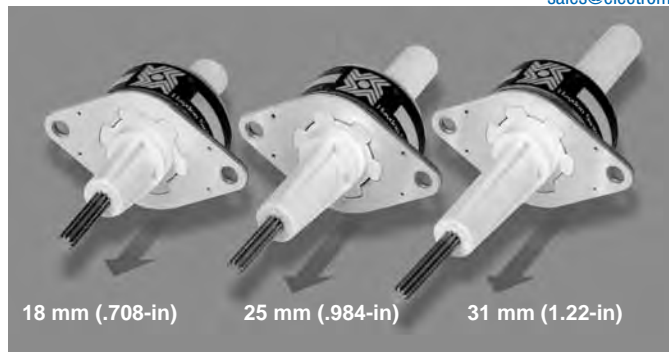
# Z26000 Series: Extended Stroke Can-Stack



HaydonKerk Motion Solutions™

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**Specially engineered Z26000 (Ø 26 mm, 1-in) linear actuators that extend captive leadscrew travel beyond 12.7 mm (1/2-in).**



## Salient Characteristics

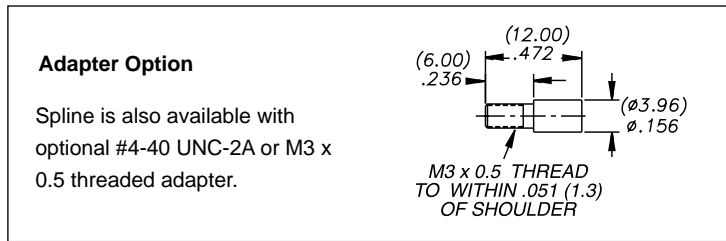
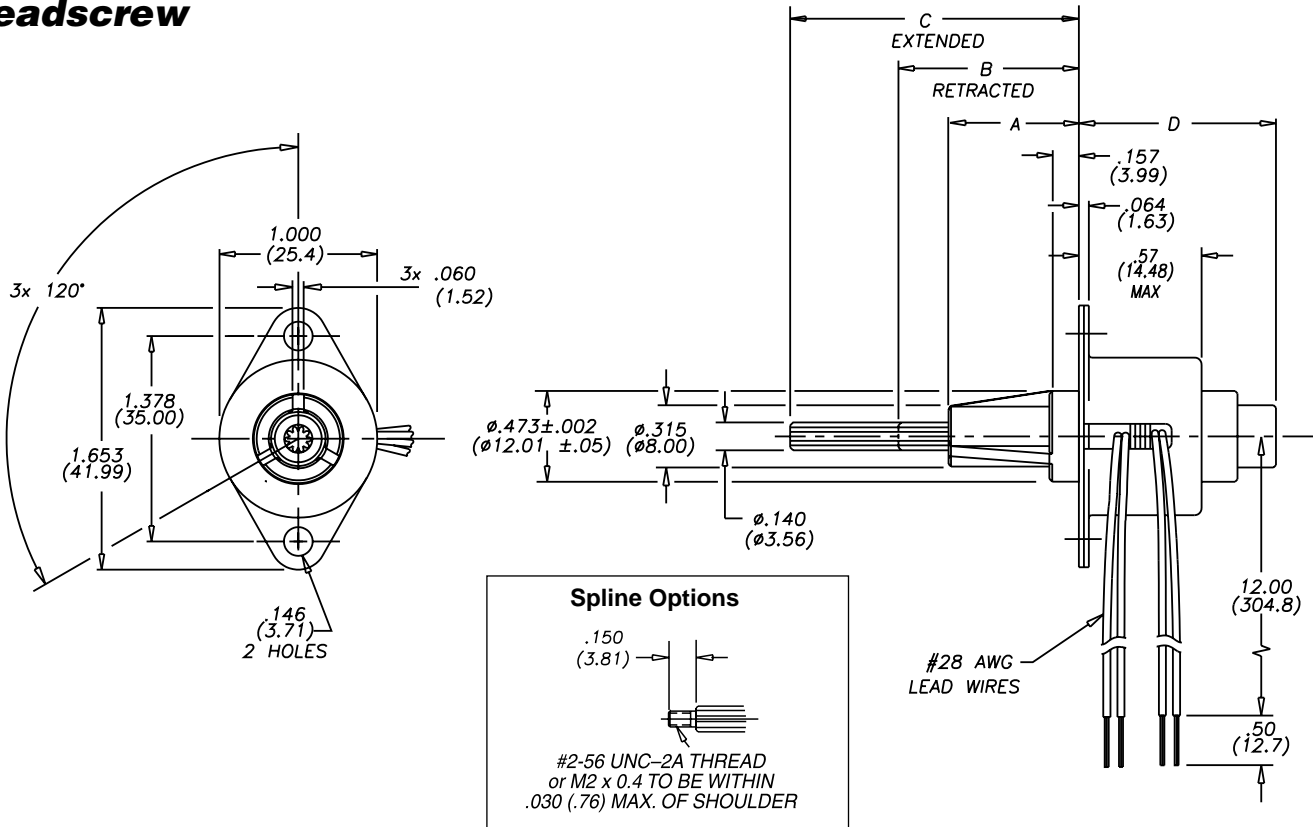
Ø 26 mm (1-in) Z-Series motor				
Wiring		Bipolar		
Part No.	Captive	Z2644X-V		Z2654X-V
Step angle		7.5°		15°
Winding voltage	5 VDC	12 VDC	5 VDC	12 VDC
Current/phase	340 mA	140 mA	340 mA	140 mA
Resistance/phase	14.7 Ω	84 Ω	14.7 Ω	84 Ω
Inductance/phase	8.5 mH	55 mH	6.7 mH	44 mH
Power consumption	3.4 W			
Rotor inertia	1.4 gcm <sup>2</sup>			
Temperature rise	135°F Rise (75°C Rise)			
Weight	1.2 oz (34 g)			
Insulation resistance	20 MΩ			

Step	Linear Travel/Step		Order Code I.D.
	inches	mm	
7.5° Angle	0.0005	0.013	3
	0.001	0.0254	1
	0.002	0.051	2
15° Angle	0.00164	0.04166	AS
	0.002	0.051	2
	0.004	0.102	4

Ø 26 mm (1-in) Z-Series motor				
Wiring		Unipolar*		
Part No.	Captive	Z2646X-V		Z2656X-V
Step angle		7.5°		15°
Winding voltage	5 VDC	12 VDC	5 VDC	12 VDC
Current/phase	340 mA	140 mA	340 mA	140 mA
Resistance/phase	14.7 Ω	84 Ω	14.7 Ω	84 Ω
Inductance/phase	4.3 mH	24 mH	3.4 mH	19 mH
Power consumption	3.4 W			
Rotor inertia	1.4 gcm <sup>2</sup>			
Temperature rise	135°F Rise (75°C Rise)			
Weight	1.2 oz (34 g)			
Insulation resistance	20 MΩ			

\* Unipolar drive gives approximately 40% less thrust vs. bipolar drive.

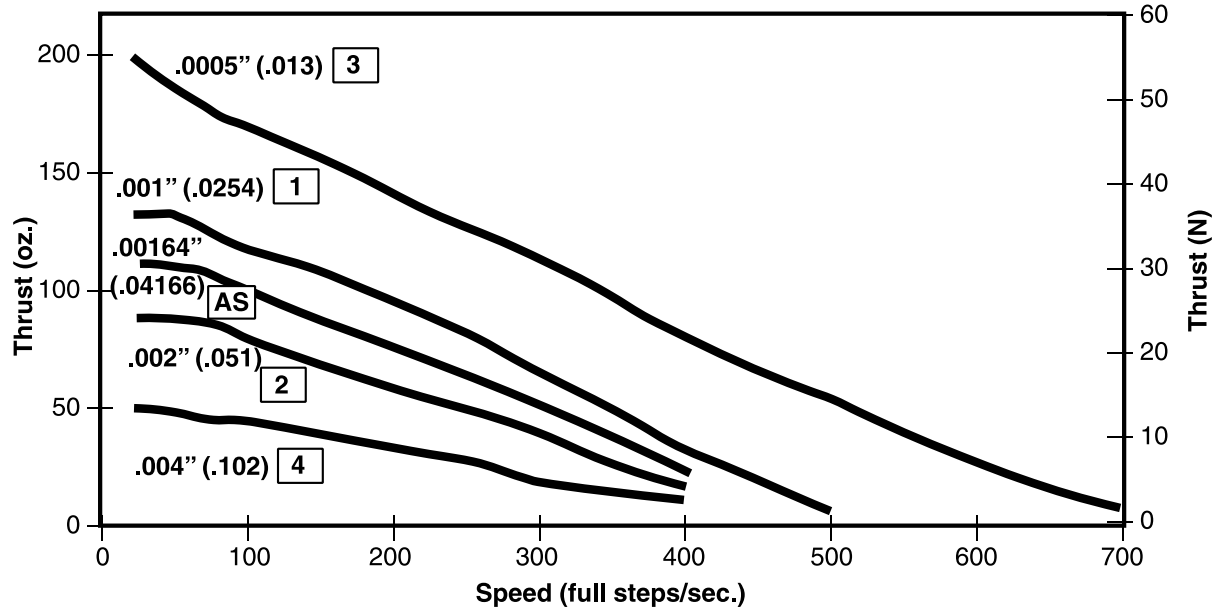
**Captive Leadscrew**



Stroke (min.)	Front Sleeve A	Retracted B	Extended C	Rear Sleeve D	Suffix Code
.708 (18 mm)	.679±.010 (17.25±.25)	.994±.025 (25.25±.64)	1.743±.015 (44.27±.38)	1.21 max. (30.7 max.)	- 918
.984 (25 mm)	.955±.010 (24.26±.25)	1.269±.025 (32.23±.64)	2.293±.015 (58.24±.38)	1.48 max. (37.6 max.)	- 925
1.22 (31 mm)	1.191±.010 (30.25±.25)	1.505±.025 (38.23±.64)	2.765±.015 (70.23±.38)	1.72 max. (43.7 max.)	- 931

## THRUST vs. FULL STEPS/SECOND

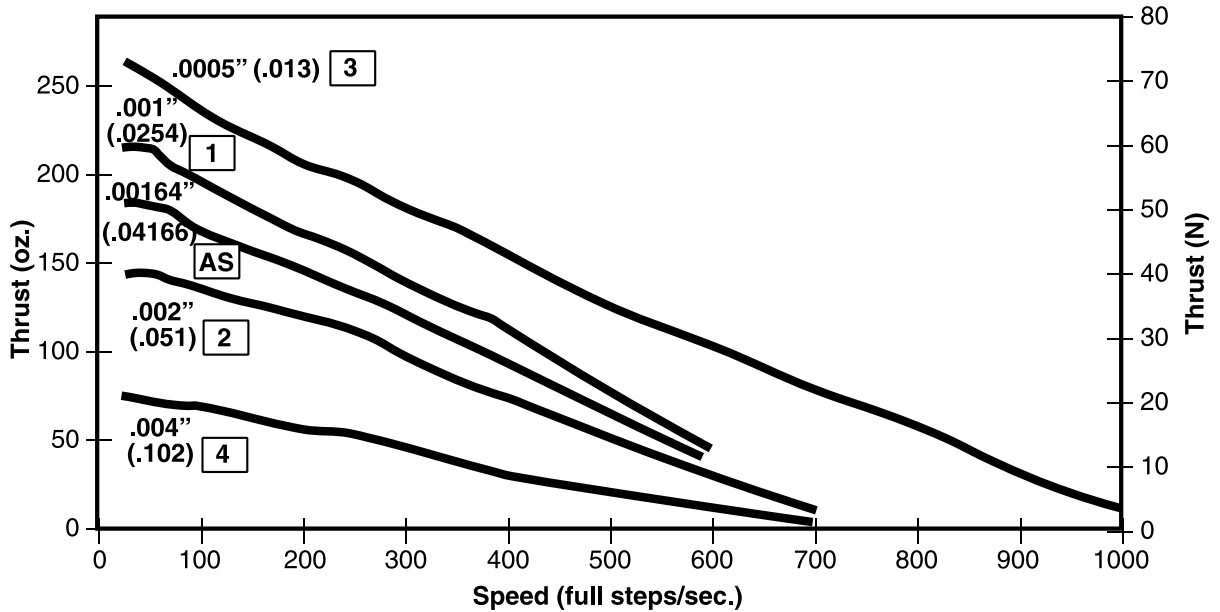
L/R Drive • Bipolar • 100% Duty Cycle



## THRUST vs. FULL STEPS/SECOND

L/R Drive • Bipolar • 25% Duty Cycle

25% duty cycle is obtained by a special winding or by running a standard motor at double the rated voltage.

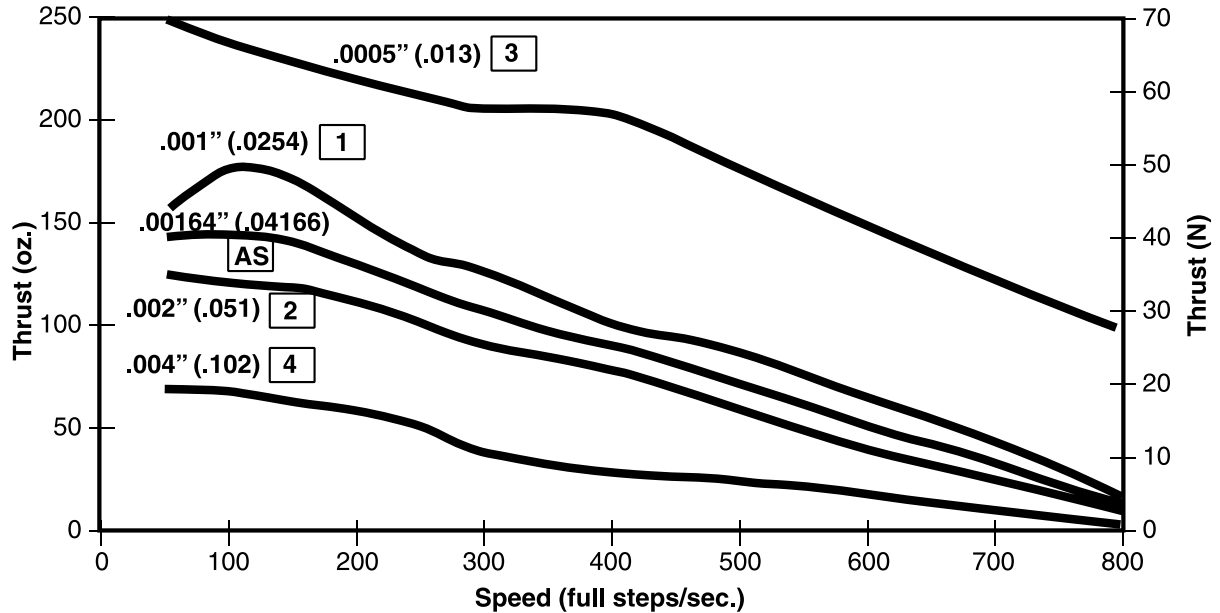


**NOTE:** Ramping can increase the performance of a motor either by increasing the top speed or getting a heavier load accelerated up to speed faster. Also, deceleration can be used to stop the motor without overshoot.



**THRUST vs. FULL STEPS/SECOND**

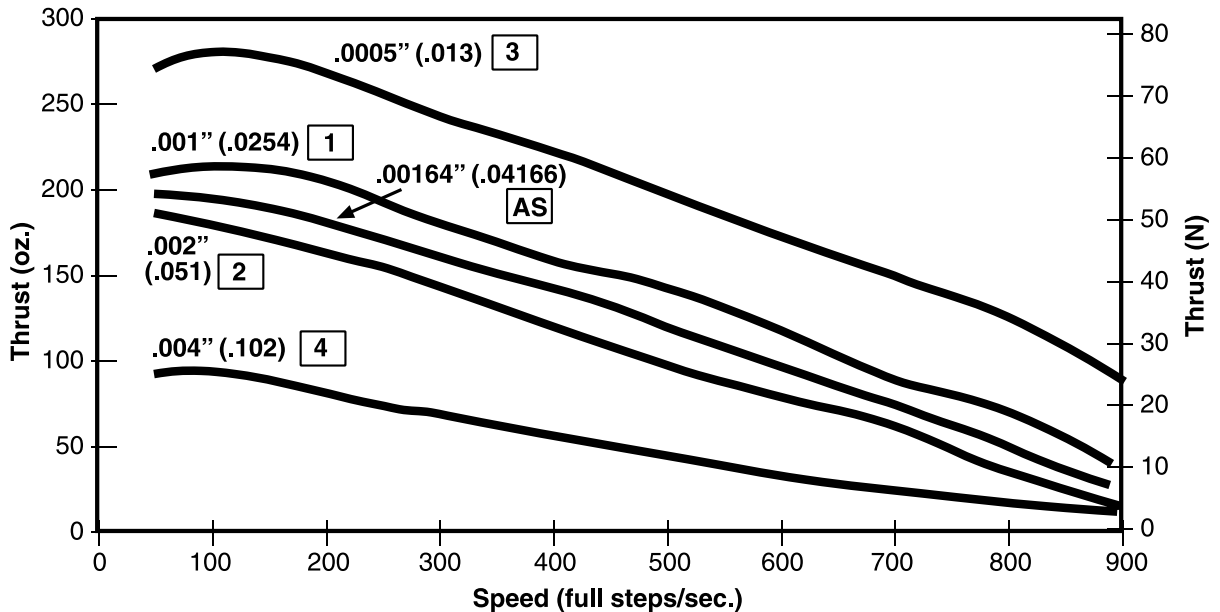
**Chopper Drive • Bipolar • 100% Duty Cycle**



**THRUST vs. FULL STEPS/SECOND**

**Chopper Drive • Bipolar • 25% Duty Cycle**

25% duty cycle is obtained by a special winding or by running a standard motor at double the rated voltage.



**NOTE:** All chopper drive curves were created with a 5 Volt motor and a 40 Volt power supply.

Ramping can increase the performance of a motor either by increasing the top speed or getting a heavier load accelerated up to speed faster. Also, deceleration can be used to stop the motor without overshoot.

## High resolution steppers for applications requiring fine step increments down to 0.00025-in (0.0064 mm).

The Haydon High Resolution 26000 Series features the smallest capability in a permanent magnet linear actuator. Motors can also be electronically micro-stepped.



### Salient Characteristics

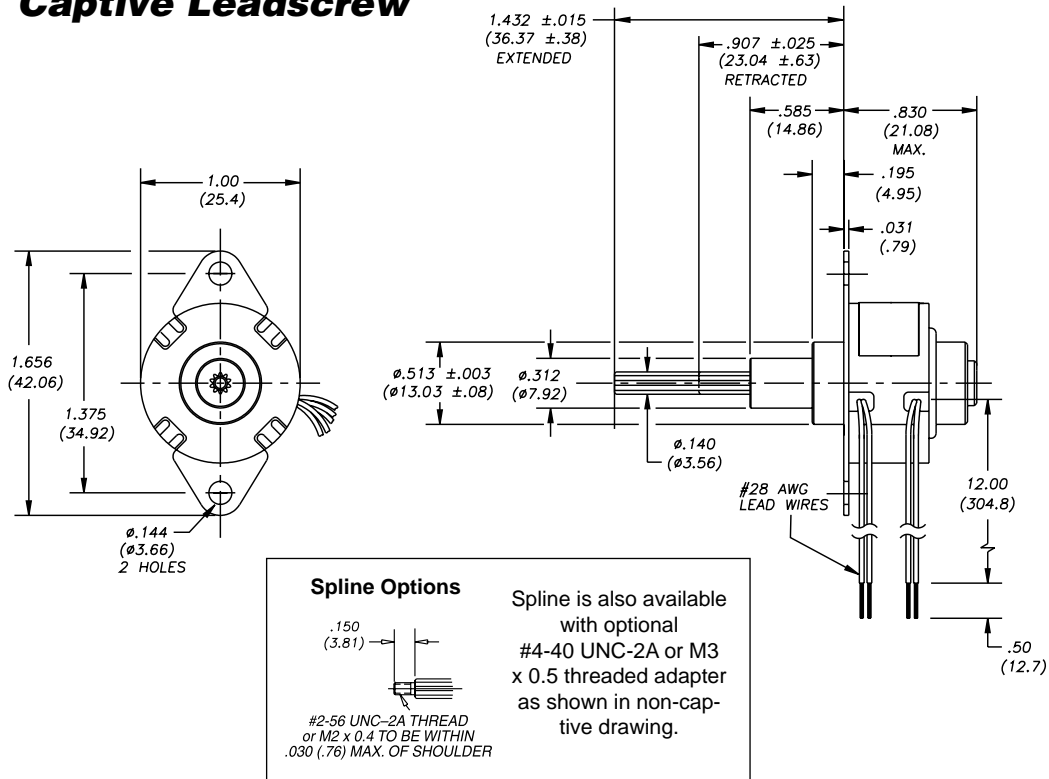
Ø 26 mm (1-in) High Resolution Motor				
Wiring		Bipolar		Unipolar*
Part No.	Captive	26449-V		26469-V
	Non-captive	26349-V		26369-V
	External	E26449-V		E26469-V
Step angle		7.5°		
Winding voltage		5 VDC	12 VDC	5 VDC 12 VDC
Current/phase		340 mA	140 mA	340 mA 140 mA
Resistance/phase		14.7 Ω	84 Ω	14.7 Ω 84 Ω
Inductance/phase		8.5 mH	55 mH	4.3 mH 24 mH
Power consumption		3.4 W		
Rotor inertia		1.2 gcm <sup>2</sup>		
Temperature rise		135°F Rise (75°C Rise)		
Weight		1.2 oz (35 g)		
Insulation resistance		20 MΩ		

Linear Travel/Step: Bipolar & Unipolar			Order Code I.D.
Step	inches	mm	
7.5° Angle	0.00025	0.00643	9

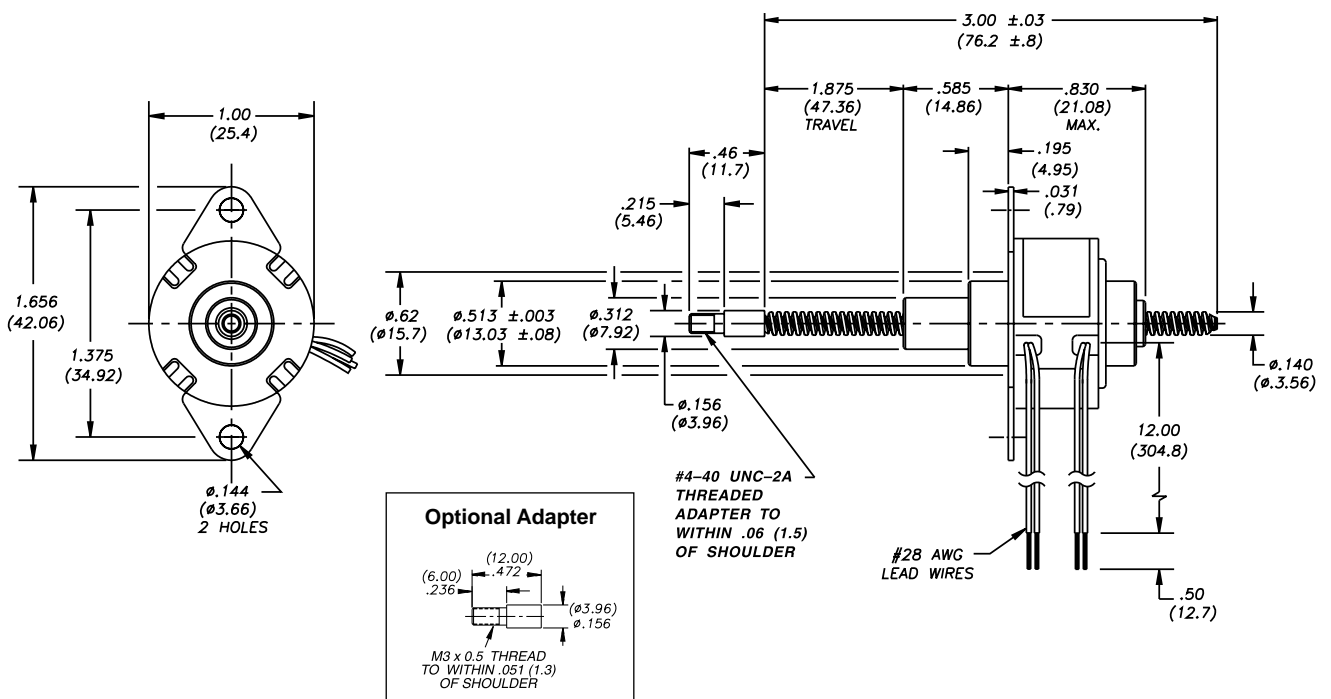
Special drive considerations may be necessary when leaving shaft fully extended or fully retracted.

\* Unipolar drive gives approximately 30% less thrust vs. bipolar drive.

**Captive Leadscrew**



**Non-Captive Leadscrew**



# 26000 Series: Can-Stack High Resolution Dimensional Drawings

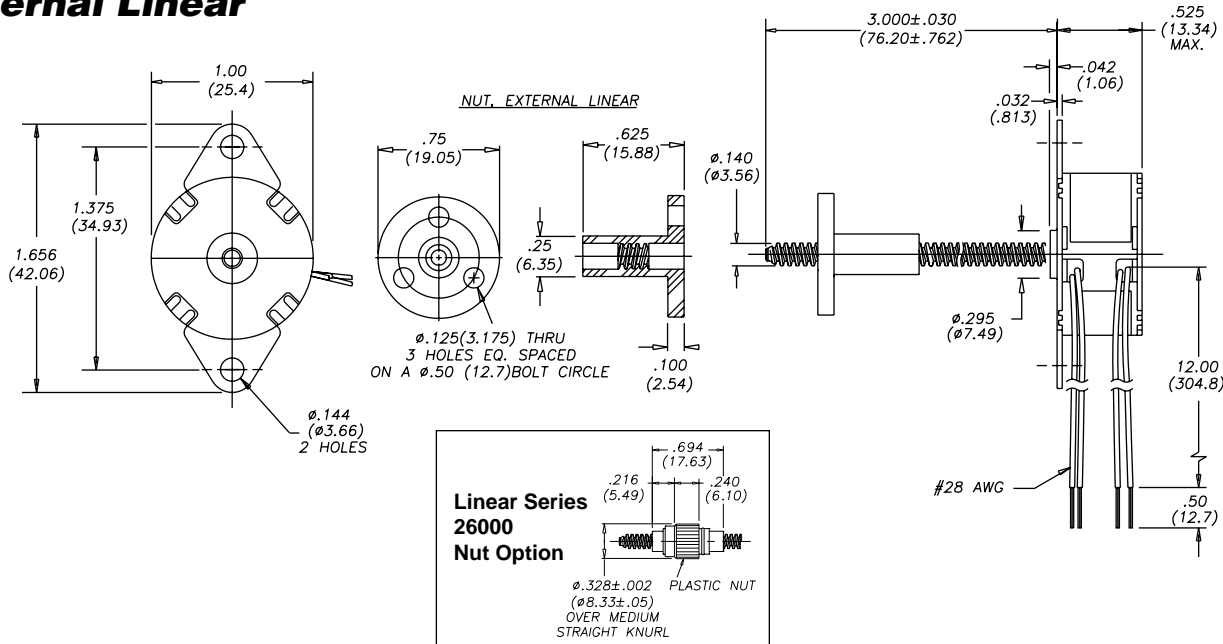


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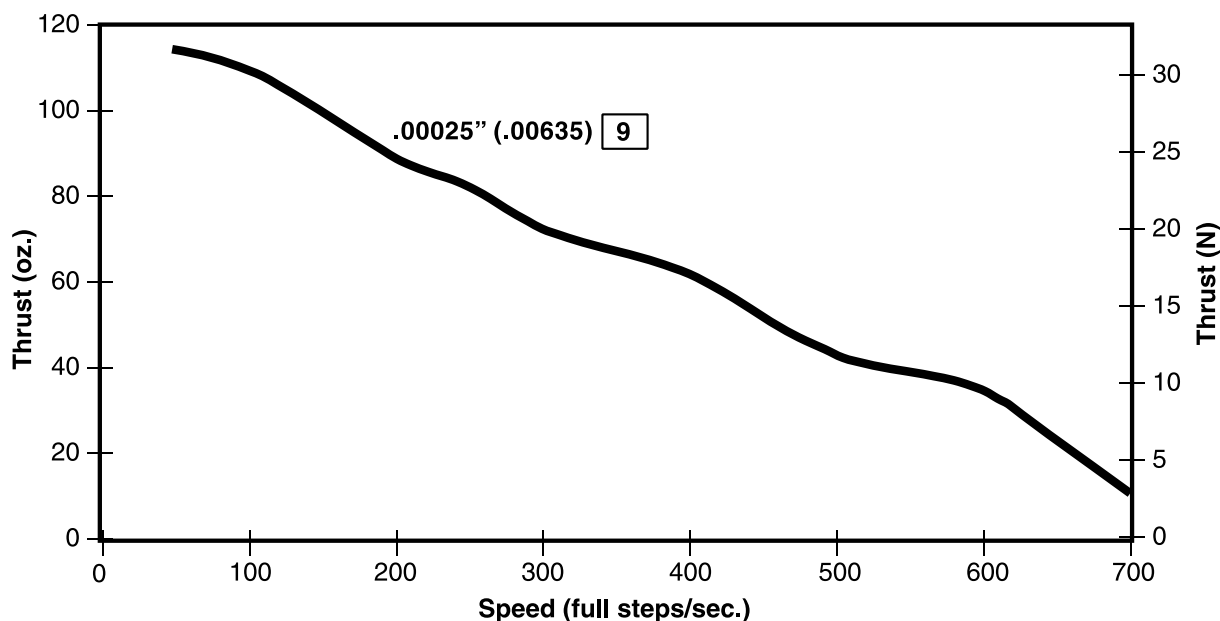
## External Linear



## 26000 Series: Can-Stack High Resolution Performance Curve

### THRUST vs. FULL STEPS/SECOND

L/R Drive • Bipolar • 100% Duty Cycle



**NOTE:** Ramping can increase the performance of a motor either by increasing the top speed or getting a heavier load accelerated up to speed faster. Also, deceleration can be used to stop the motor without overshoot.

**Higher thrust... more versatility  
and greater durability.**

**Salient Characteristics**

Ø 36 mm (1.4-in) motor					
Wiring		Bipolar			
Part No.	Captive	3644X-V		3654X-V	
	Non-captive	3634X-V		3684X-V	
	External	E3644X-V		E3654X-V	
Step angle		7.5°		15°	
Winding voltage		5 VDC	12 VDC	5 VDC	12 VDC
Current/phase		460 mA	190 mA	460 mA	190 mA
Resistance/phase		11 Ω	63 Ω	11 Ω	63 Ω
Inductance/phase		7.2 mH	45 mH	5.5 mH	35 mH
Power consumption		4.6 W			
Rotor inertia		10.5 gcm <sup>2</sup>			
Temperature rise		135°F Rise (75°C Rise)			
Weight		3 oz (86 g)			
Insulation resistance		20 MΩ			

Ø 36 mm (1.4-in) motor					
Wiring		Unipolar*			
Part No.	Captive	3646X-V		3656X-V	
	Non-captive	3636X-V		3686X-V	
	External	E3646X-V		E3656X-V	
Step angle		7.5°		15°	
Winding voltage		5 VDC	12 VDC	5 VDC	12 VDC
Current/phase		460 mA	190 mA	460 mA	190 mA
Resistance/phase		11 Ω	63 Ω	11 Ω	63 Ω
Inductance/phase		3.8 mH	19 mH	3 mH	15 mH
Power consumption		4.6 W			
Rotor inertia		10.5 gcm <sup>2</sup>			
Temperature rise		135°F Rise (75°C Rise)			
Weight		3 oz (86 g)			
Insulation resistance		20 MΩ			

\* Unipolar drive gives approximately 30% less thrust vs. bipolar drive.

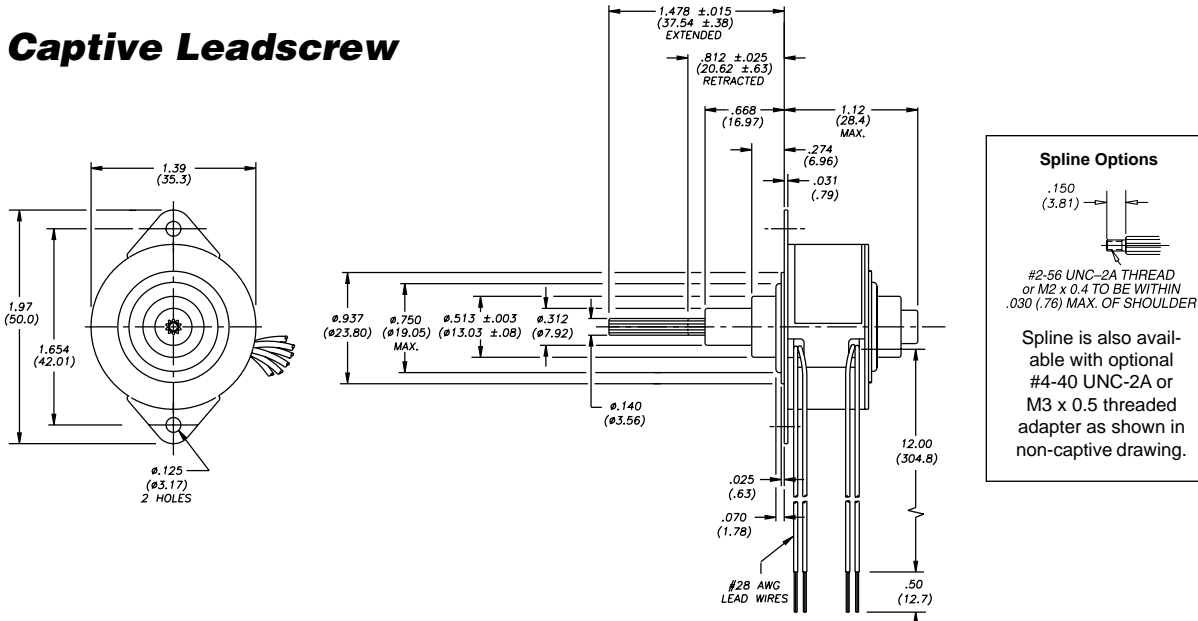


Other styles available...

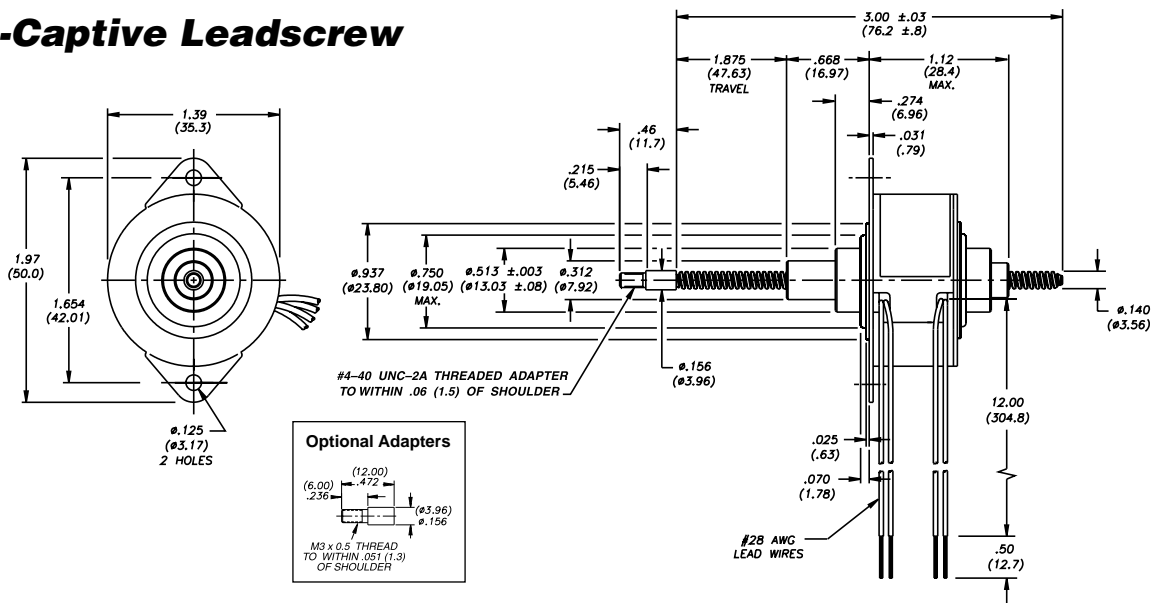
- High Resolution Series
- Teflon® lead-screw
- High Temperature Option

Step	Linear Travel/Step		Order Code I.D.
	inches	mm	
7.5° Angle	0.0005	0.013	3
	0.001	0.0254	1
	0.002	0.051	2
15° Angle	0.002	0.051	2
	0.004	0.102	4

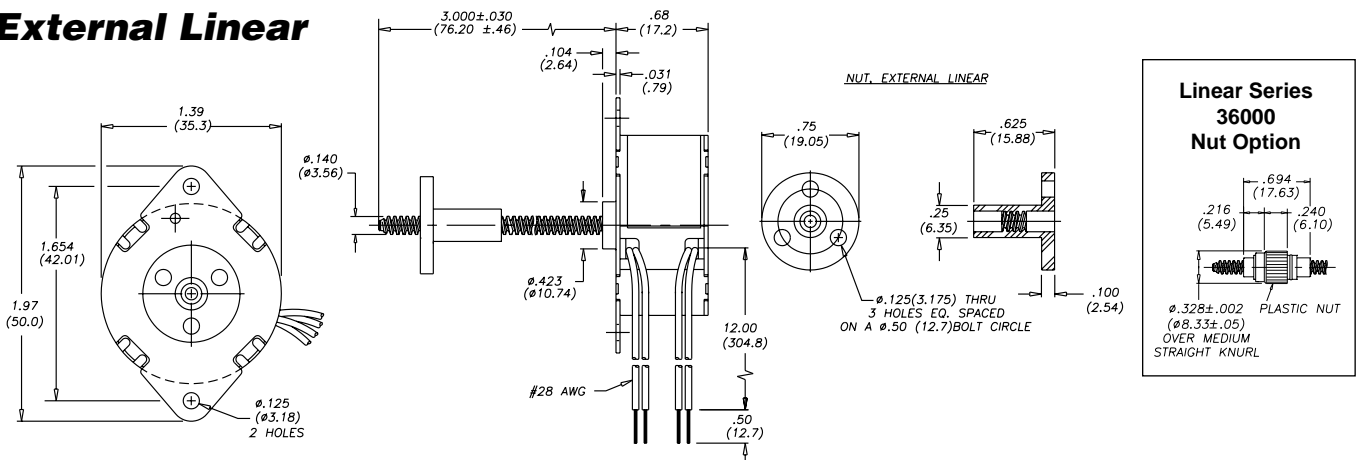
## Captive Leadscrew



## Non-Captive Leadscrew

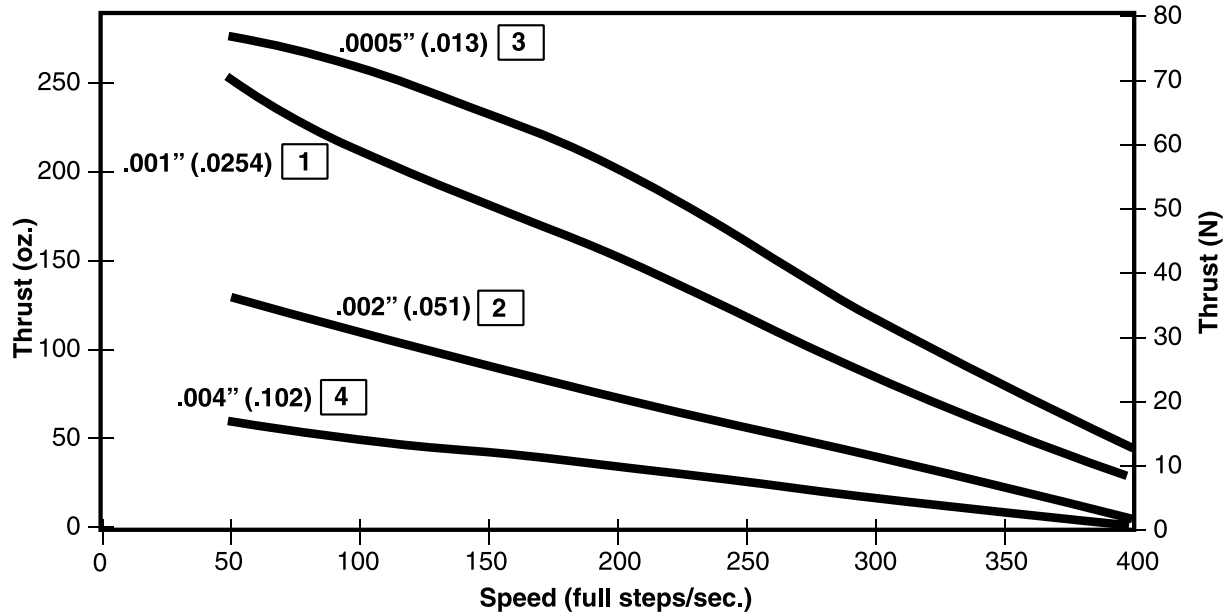


## External Linear



**THRUST vs. FULL STEPS/SECOND**

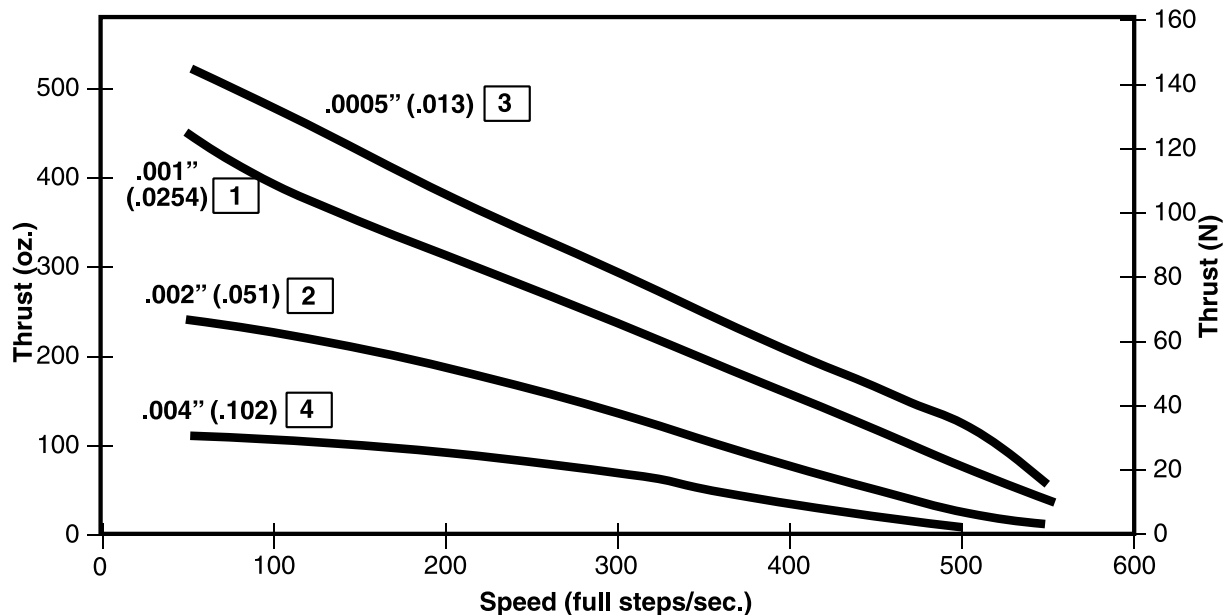
**L/R Drive • Bipolar • 100% Duty Cycle**



**THRUST vs. FULL STEPS/SECOND**

**L/R Drive • Bipolar • 25% Duty Cycle**

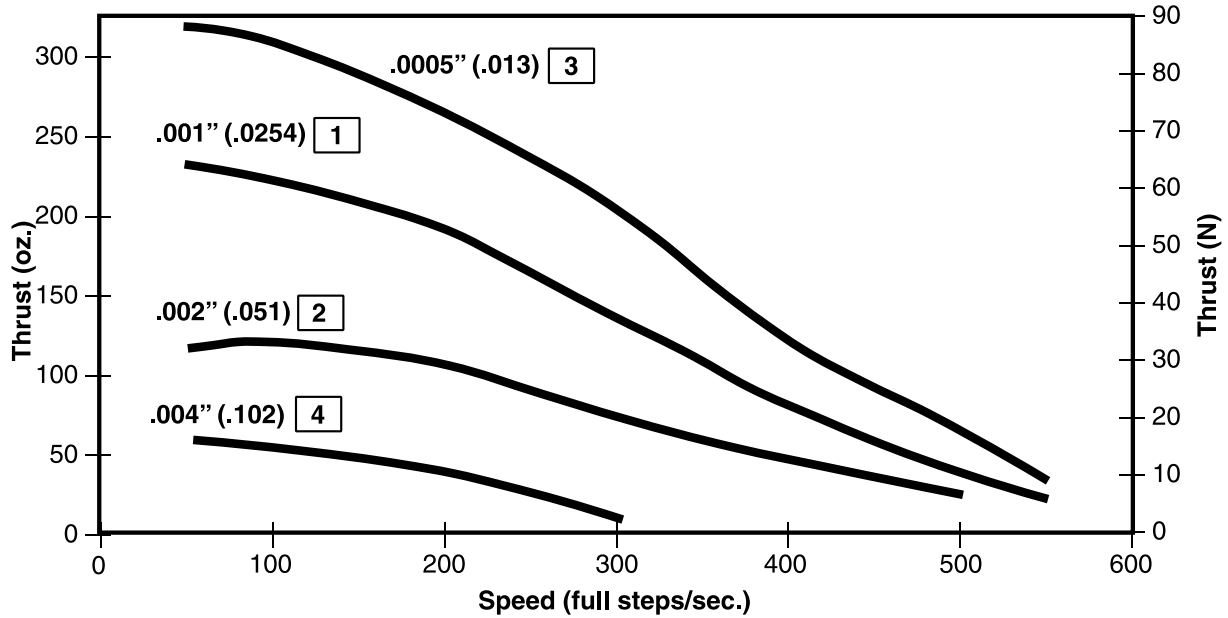
25% duty cycle is obtained by a special winding or by running a standard motor at double the rated voltage.



**NOTE:** Ramping can increase the performance of a motor either by increasing the top speed or getting a heavier load accelerated up to speed faster. Also, deceleration can be used to stop the motor without overshoot.

## THRUST vs. FULL STEPS/SECOND

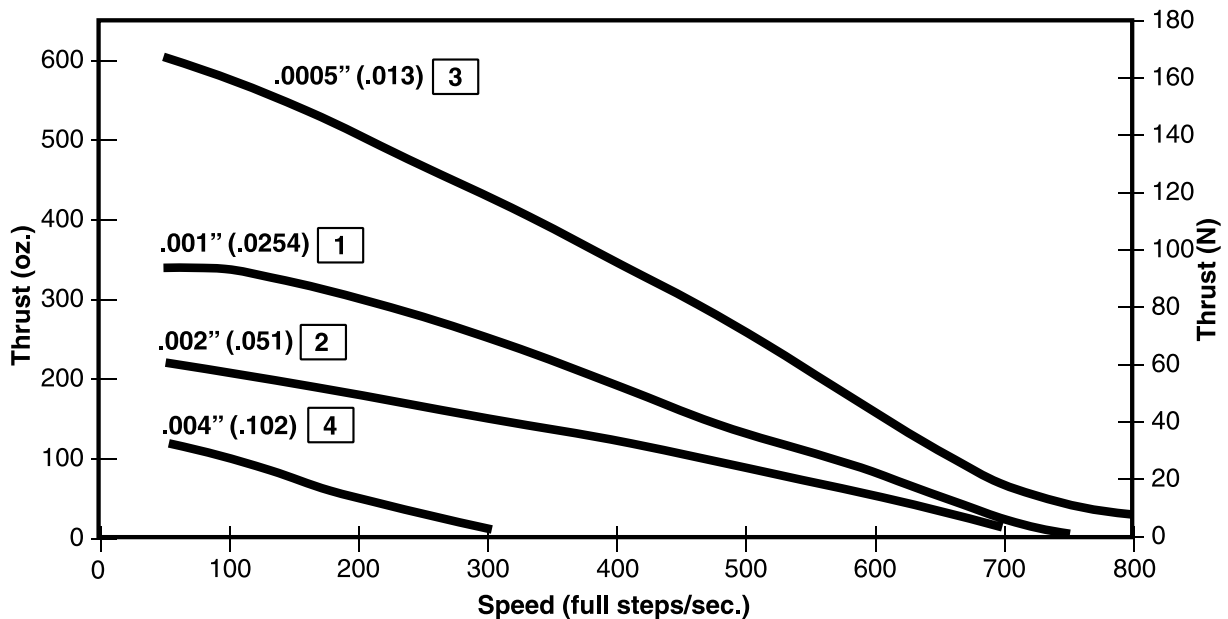
Chopper Drive • Bipolar • 100% Duty Cycle



## THRUST vs. FULL STEPS/SECOND

Chopper Drive • Bipolar • 25% Duty Cycle

25% duty cycle is obtained by a special winding or by running a standard motor at double the rated current.



**NOTE:** All chopper drive curves were created with a 5 Volt motor and a 40 Volt power supply.

Ramping can increase the performance of a motor either by increasing the top speed or getting a heavier load accelerated up to speed faster. Also, deceleration can be used to stop the motor without overshoot.





## Precise linear motion control down to 0.000125-in (0.0032 mm)

The Haydon™ High Resolution 36000 Series features a choice of two extremely small step increments, 0.000125-in (0.0032 mm) and 0.00025-in (0.0064 mm). Motors can also be electronically micro-stepped.

### Salient Characteristics

Ø 36 mm (1.4") High Resolution Motor					
Wiring		Bipolar		Unipolar*	
Part No.	Captive	3624X-V		3626X-V	
	Non-captive	3614X-V		3616X-V	
	External	E3624X-V		3626X-V	
Step angle		3.75°			
Winding voltage		5 VDC	12 VDC	5 VDC	12 VDC
Current/phase		460 mA	190 mA	460 mA	190 mA
Resistance/phase		11 Ω	63 Ω	11 Ω	63 Ω
Inductance/phase		9.2 mH	53 mH	4.6 mH	26 mH
Power consumption		4.6 W			
Rotor inertia		10.5 gcm <sup>2</sup>			
Temperature rise		135°F Rise (75°C Rise)			
Weight		3 oz (86 g)			
Insulation resistance		20 MΩ			

Step Angle	Linear Travel/Step: Bipolar & Unipolar		Order Code I.D.
	inches	mm	
3.75°	0.000125	0.0032	7
	0.00025	0.0064	9

\* Unipolar drive gives approximately 30% less thrust vs. bipolar drive.

# 36000 Series: Can-Stack High Resolution Dimensional Drawings

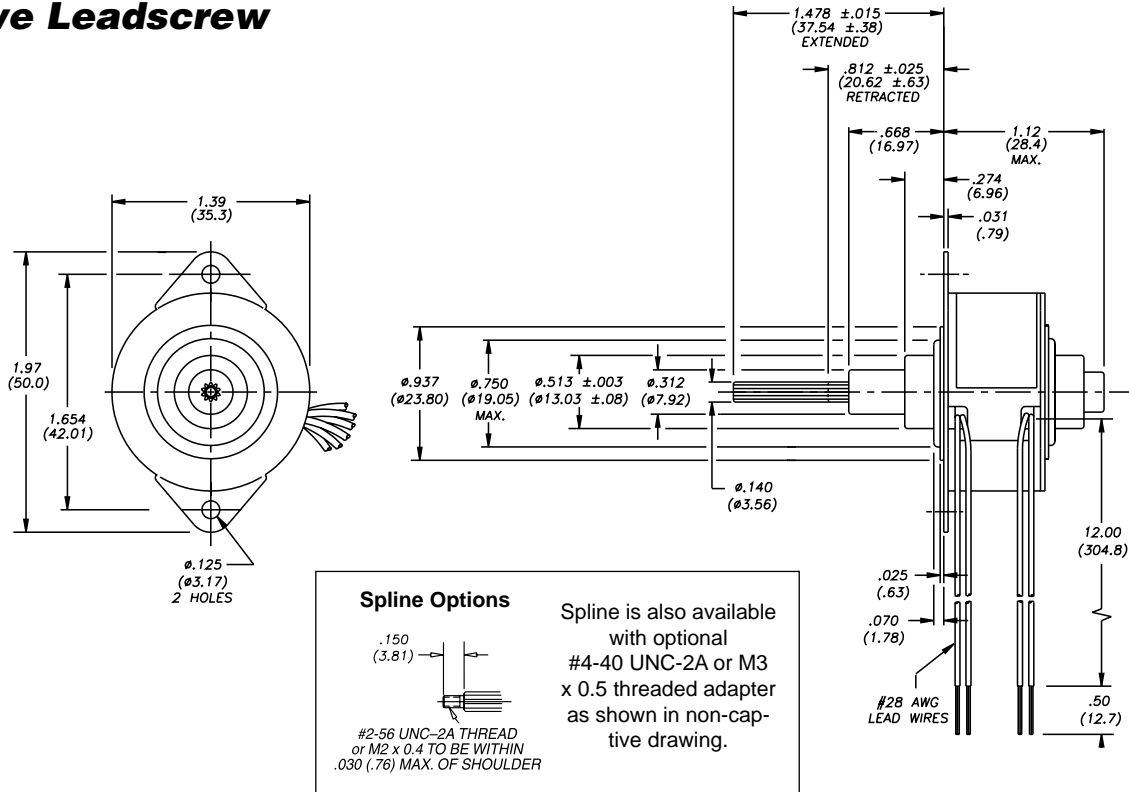


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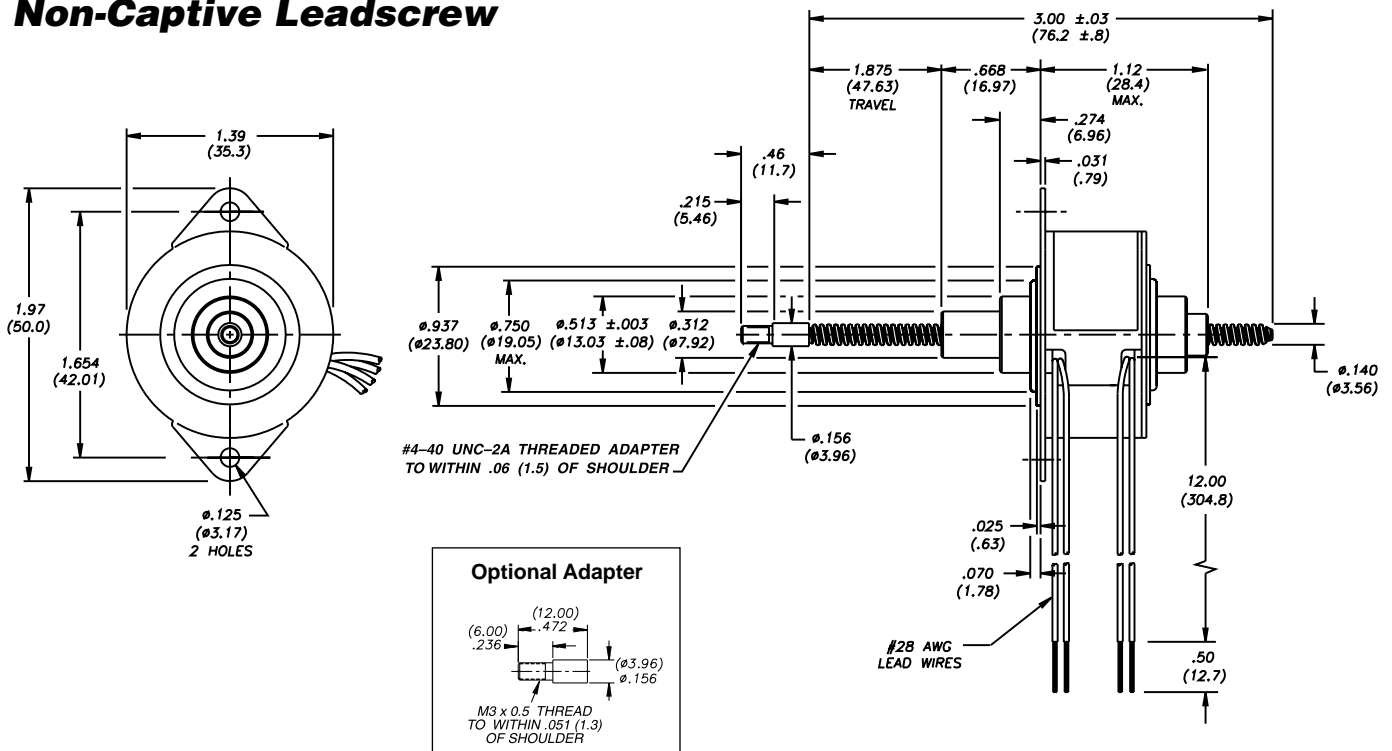
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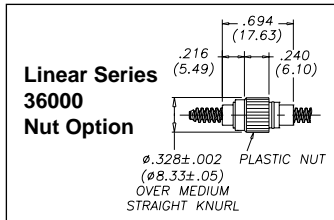
## Captive Leadscrew



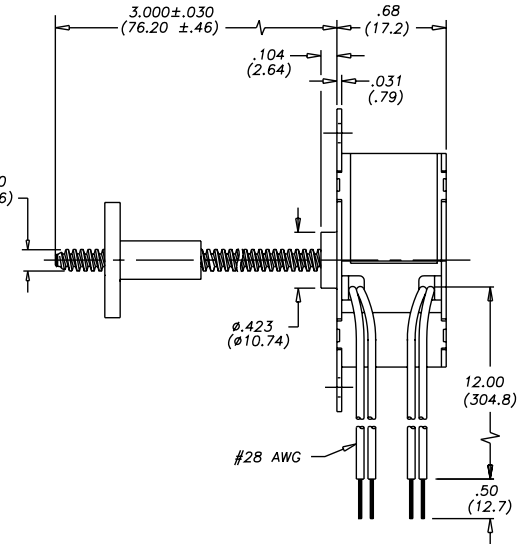
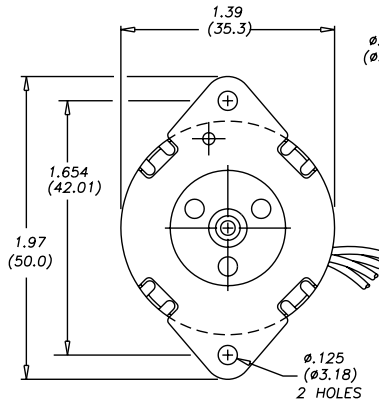
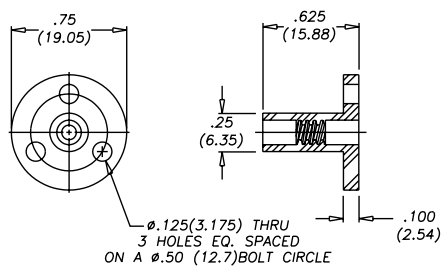
## Non-Captive Leadscrew



**External Linear**



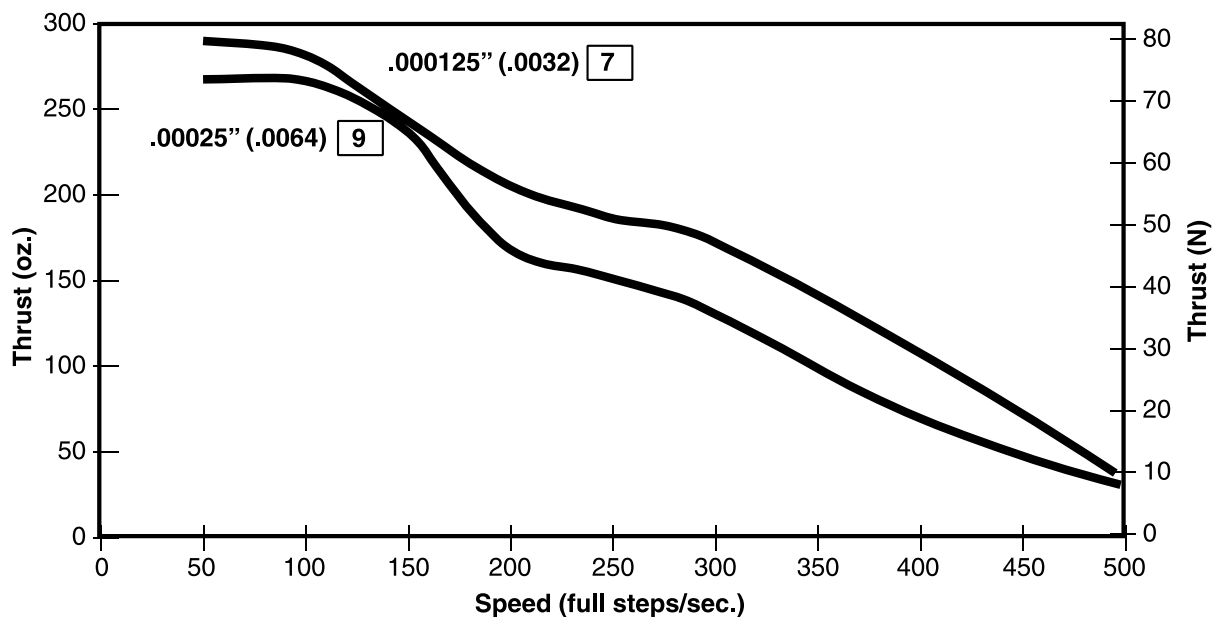
NUT, EXTERNAL LINEAR



**36000 Series: Can-Stack High Resolution Performance Curves**

**THRUST vs. FULL STEPS/SECOND**

L/R Drive • Bipolar • 100% Duty Cycle



**NOTE:** Ramping can increase the performance of a motor either by increasing the top speed or getting a heavier load accelerated up to speed faster. Also, deceleration can be used to stop the motor without overshoot.

# 46000 Series: Ø 46 mm (1.8-in) Can-Stack



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**Heavy-duty... power, versatility, size and long-lasting durability.**

## Salient Characteristics

Ø 46 mm (1.8-in) motor				
Wiring		Bipolar		
Part No.	Captive	4644X-V		4654X-V
	Non-captive	4634X-V		4684X-V
	External	E4644X-V		E4654X-V
Step angle		7.5°		15°
Winding voltage		5 VDC	12 VDC	5 VDC 12 VDC
Current/phase		1.0 A	.41 A	1.0 A .41 A
Resistance/phase		5 Ω	29 Ω	5 Ω 29 Ω
Inductance/phase		9 mH	52 mH	7.1 mH 39 mH
Power consumption		10 W		
Rotor inertia		25.0 gcm <sup>2</sup>		
Temperature rise		135°F Rise (75°C Rise)		
Weight		9.0 oz (255 g)		
Insulation resistance		20 MΩ		

Ø 46 mm (1.8-in) motor				
Wiring		Unipolar*		
Part No.	Captive	4646X-V		4656X-V
	Non-captive	4636X-V		4686X-V
	External	E4646X-V		E4656X-V
Step angle		7.5°		15°
Winding voltage		5 VDC	12 VDC	5 VDC 12 VDC
Current/phase		1.0 A	.41 A	1.0 A .41 A
Resistance/phase		5 Ω	29 Ω	5 Ω 29 Ω
Inductance/phase		4.5 mH	26 mH	3.5 mH 20 mH
Power consumption		10 W		
Rotor inertia		25.0 gcm <sup>2</sup>		
Temperature rise		135°F Rise (75°C Rise)		
Weight		9.0 oz (255 g)		
Insulation resistance		20 MΩ		

\* Unipolar drive gives approximately 30% less thrust than bipolar drive.

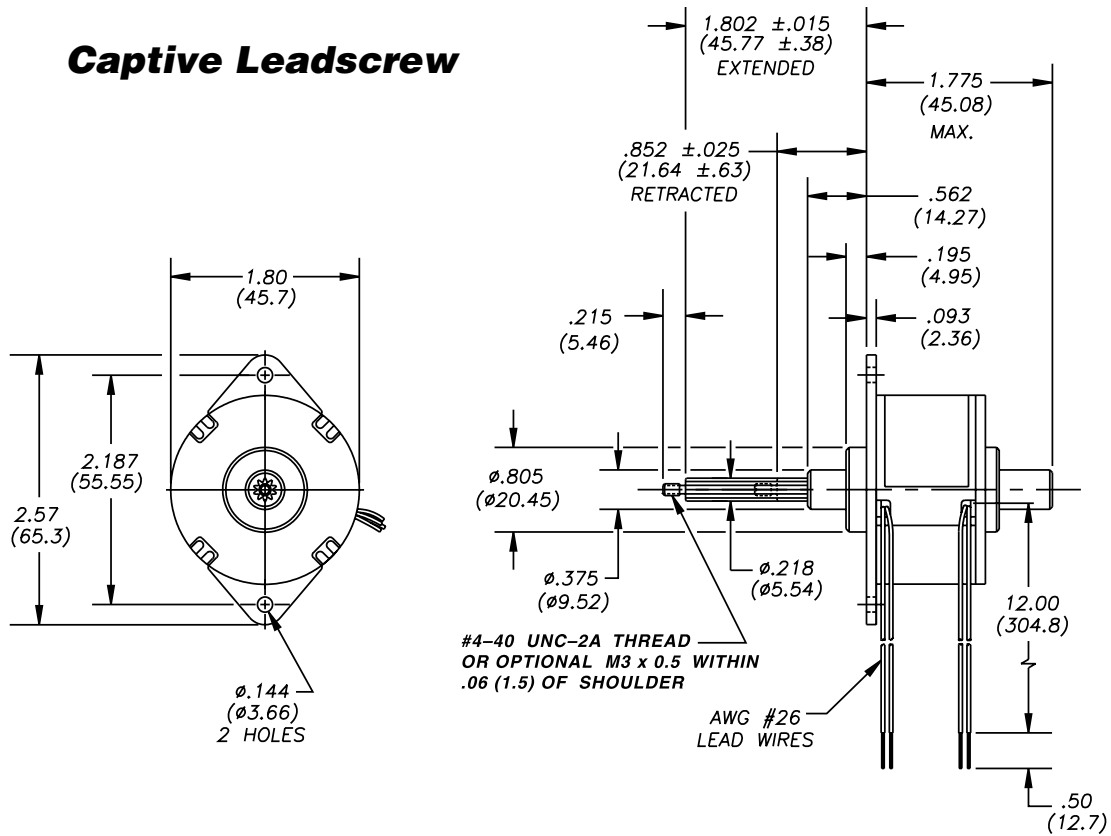


Other styles available...

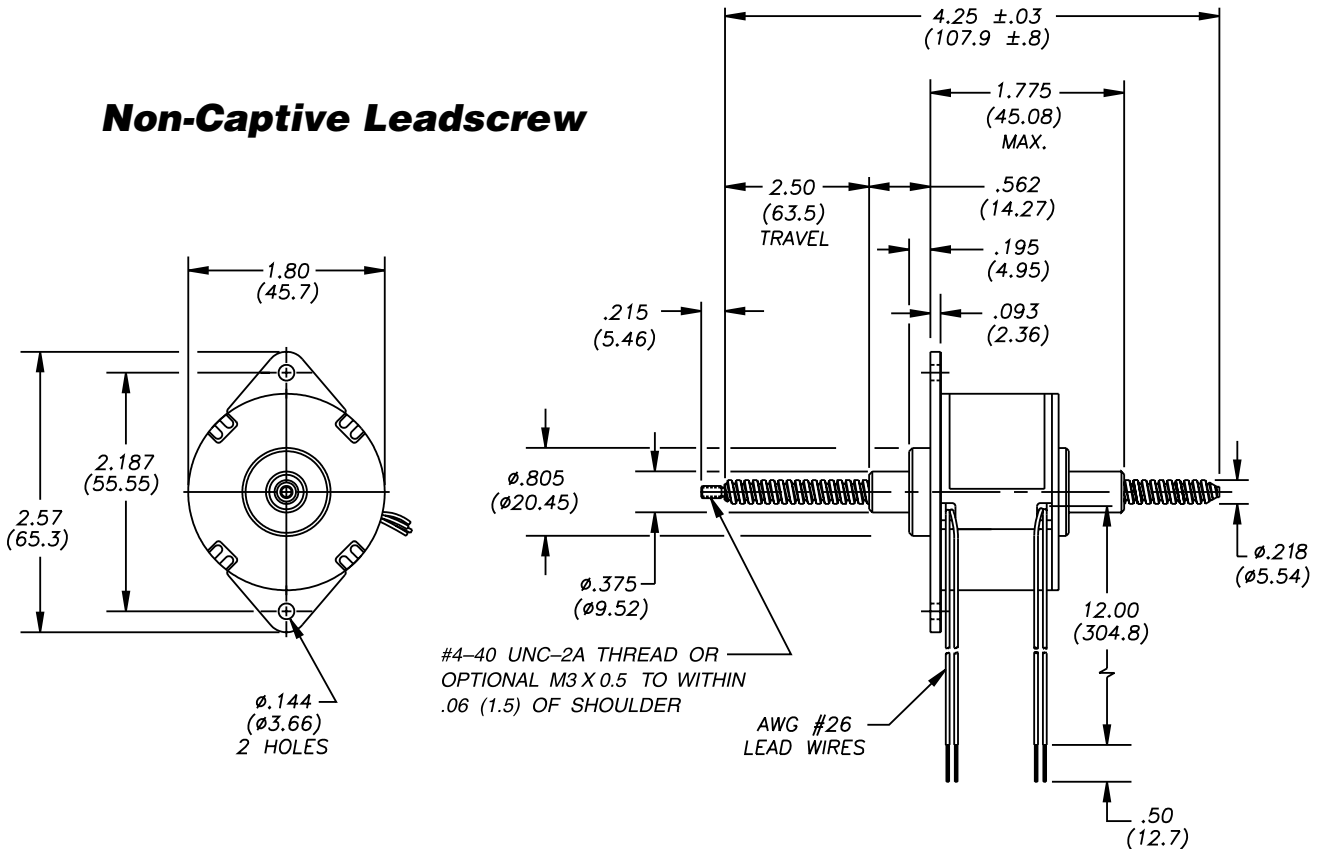
- Teflon® lead-screw
- High Temperature Option

Step	Linear Travel/Step		Order Code I.D.
	inches	mm	
7.5° Angle	0.0005	0.013	3
	0.001	0.0254	1
	0.002	0.051	2
	0.004	0.102	4
	0.008	0.203	8
15° Angle	0.004	0.102	4
	0.008	0.203	8
	0.016	0.406	G

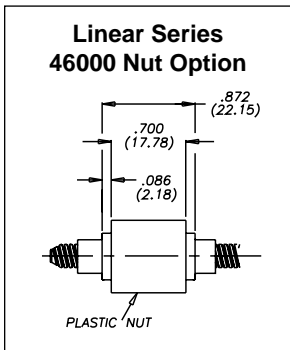
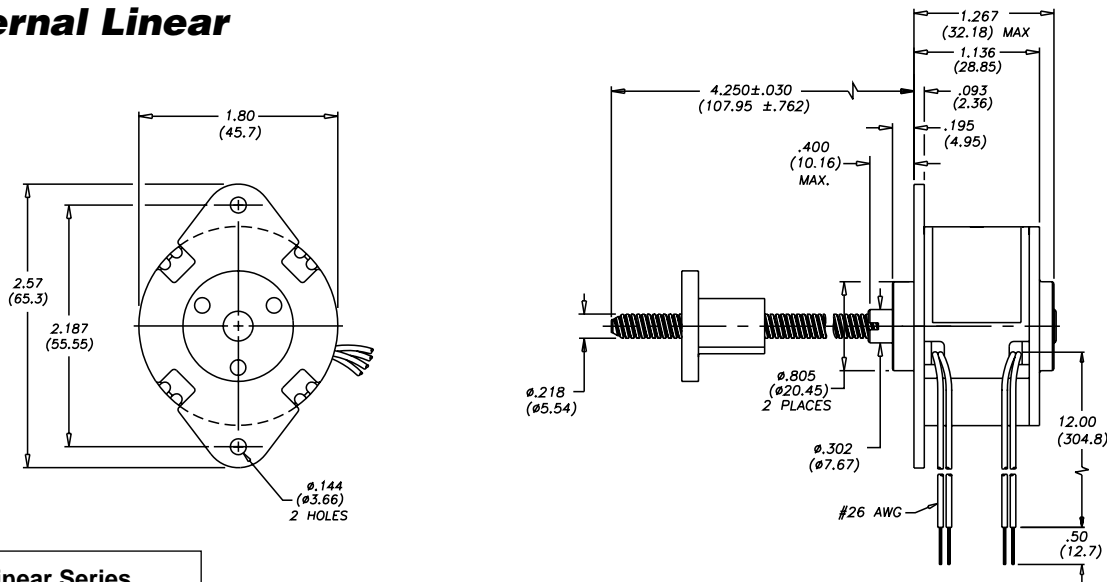
**Captive Leadscrew**



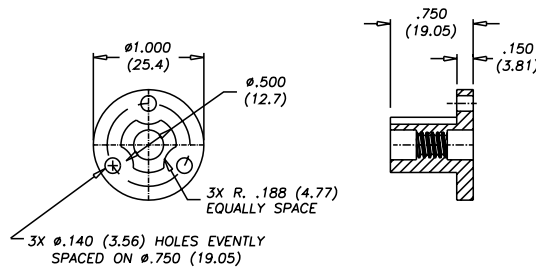
**Non-Captive Leadscrew**



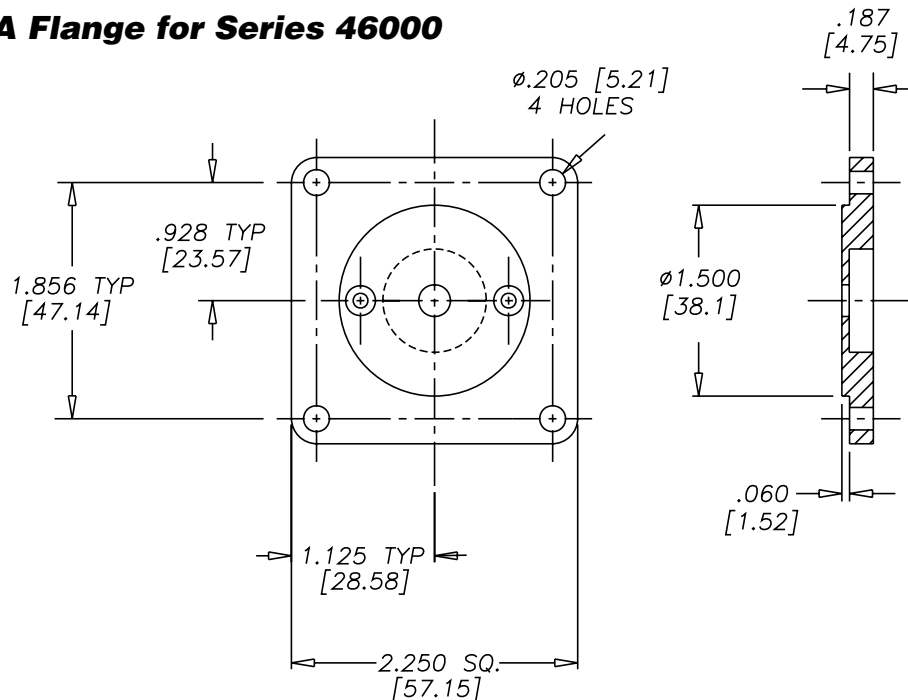
## External Linear



NUT, EXTERNAL LINEAR

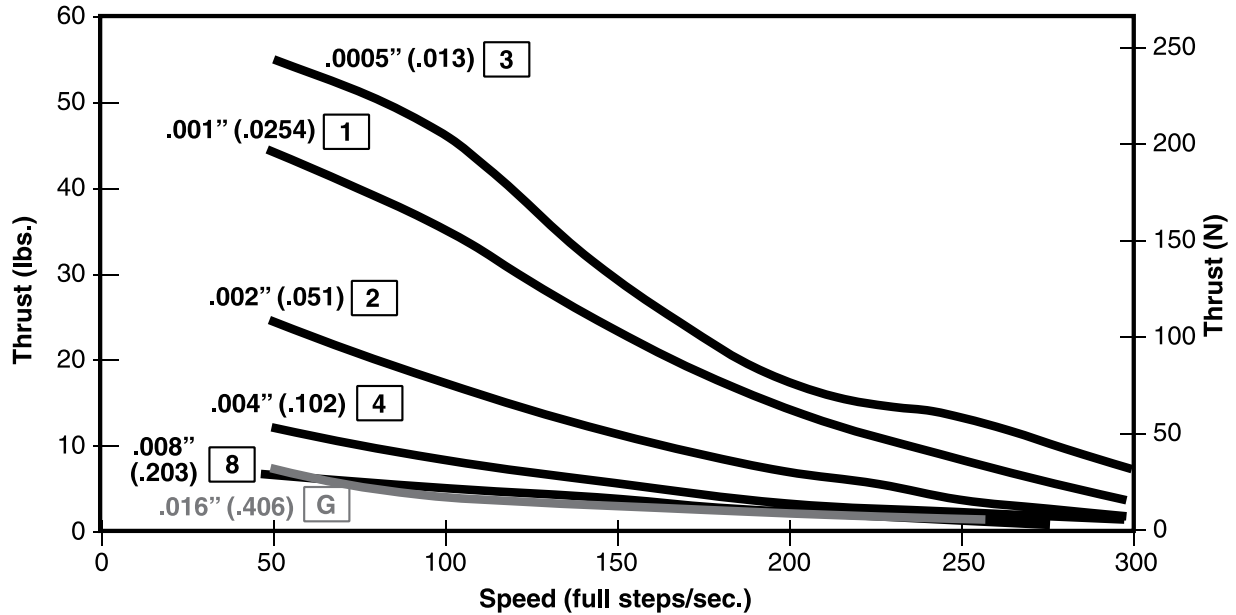


## Optional NEMA Flange for Series 46000



**THRUST vs. FULL STEPS/SECOND**

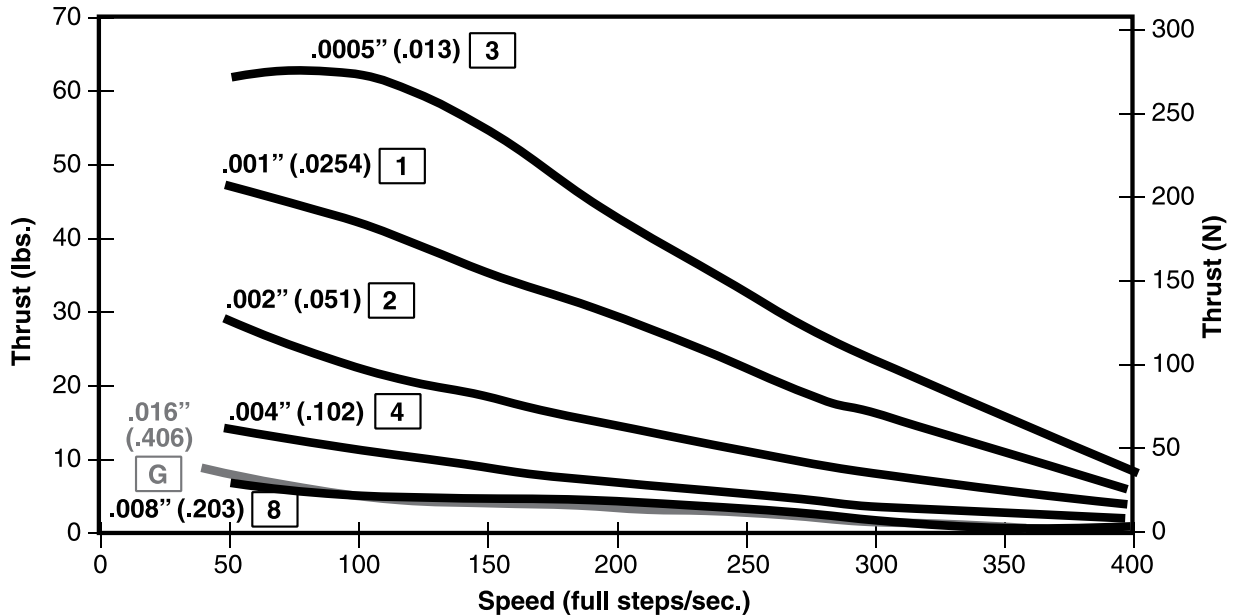
L/R Drive • Bipolar • 100% Duty Cycle



**THRUST vs. FULL STEPS/SECOND**

L/R Drive • Bipolar • 25% Duty Cycle

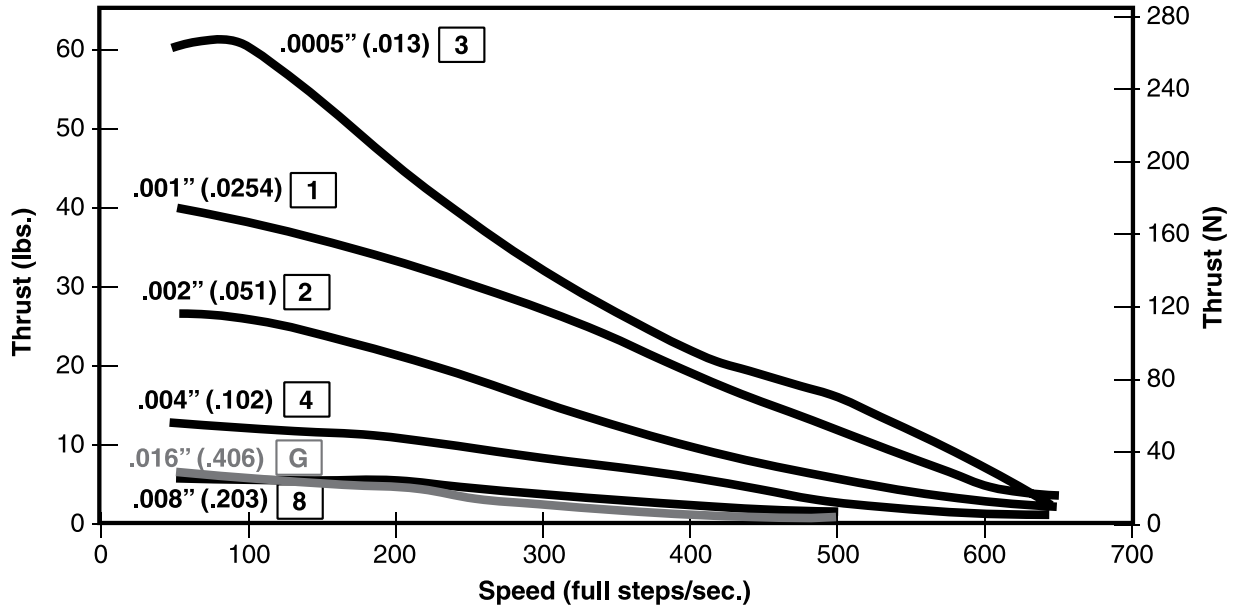
25% duty cycle is obtained by a special winding or by running a standard motor at double the rated voltage.



**NOTE:** Ramping can increase the performance of a motor either by increasing the top speed or getting a heavier load accelerated up to speed faster. Also, deceleration can be used to stop the motor without overshoot.

## THRUST vs. FULL STEPS/SECOND

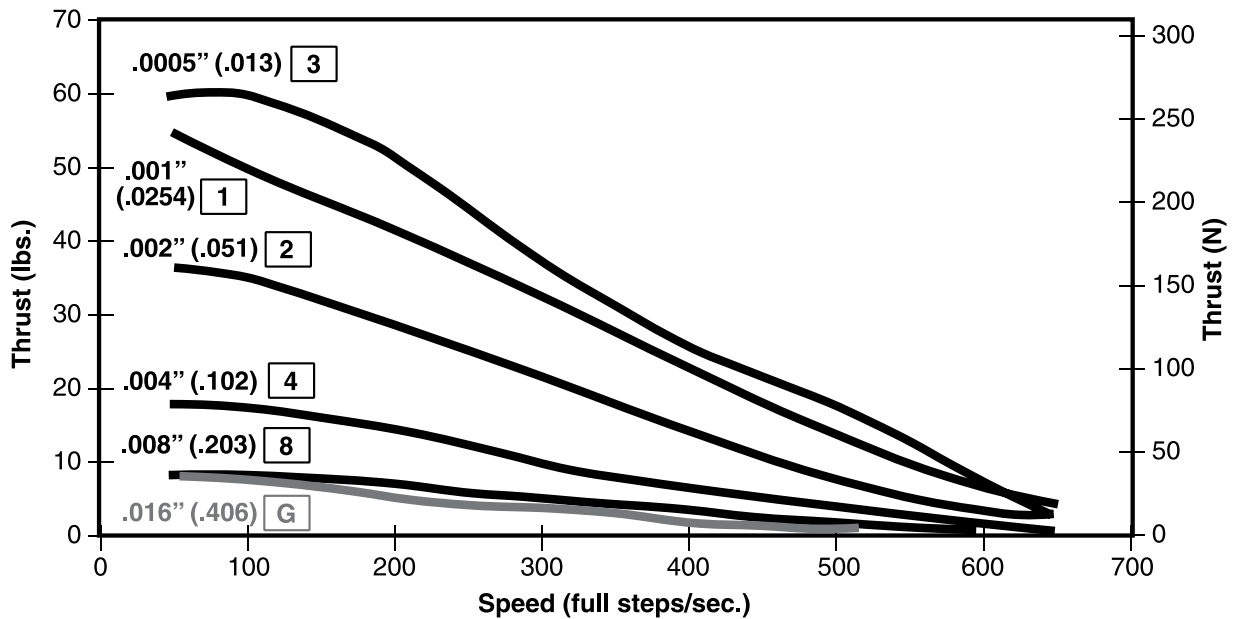
Chopper Drive • Bipolar • 100% Duty Cycle



## THRUST vs. FULL STEPS/SECOND

Chopper Drive • Bipolar • 25% Duty Cycle

25% duty cycle is obtained by a special winding or by running a standard motor at double the rated current.



**NOTE:** All chopper drive curves were created with a 5 Volt motor and a 40 Volt power supply.

Ramping can increase the performance of a motor either by increasing the top speed or getting a heavier load accelerated up to speed faster. Also, deceleration can be used to stop the motor without overshoot.

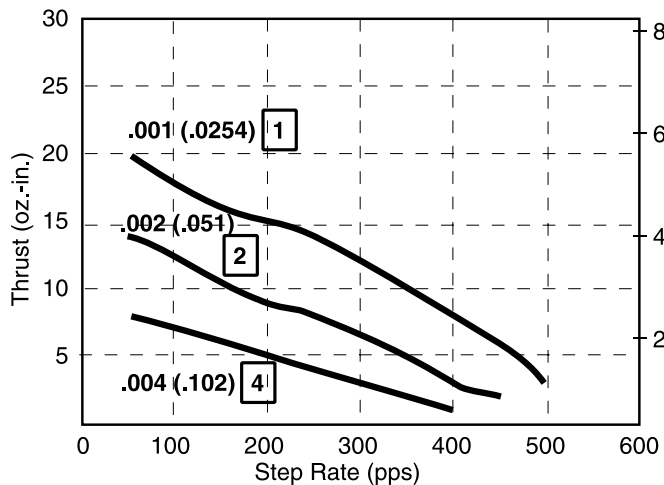




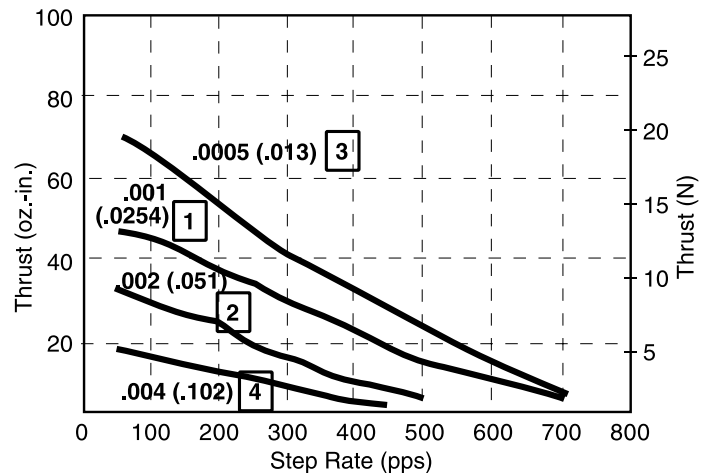
**Specially engineered can-stack linear actuators made with technology capable of temperatures beyond 155° C (311° F).**

HaydonKerk Motion Solutions™ offers a line of stepping motors specially designed for high temperature environments. The motors are constructed using the proven techniques employed for Haydon™ motors. Special materials which meet IEEE class F temperature ratings of 155° C (311° F) are used in construction. Specialized components include high temperature bobbins, coils, lead wires, lubricant and adhesives. If your application requirements exceed 155°C contact our applications group for a customized solution.

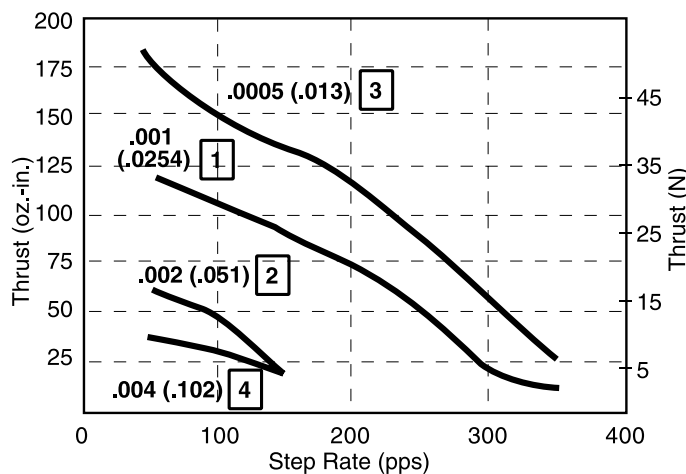
**20000 Series High Temperature**  
L/R Drive, 100% Duty Cycle



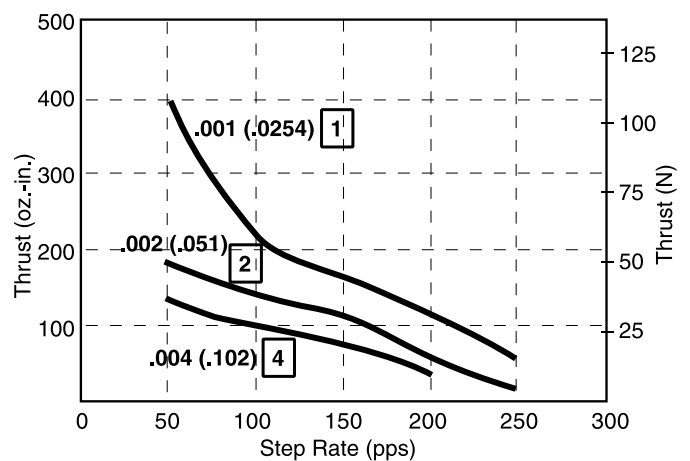
**26000 Series High Temperature**  
L/R Drive, 100% Duty Cycle



**36000 Series High Temperature**  
L/R Drive, 100% Duty Cycle



**46000 Series High Temperature**  
L/R Drive, 100% Duty Cycle



All data was taken at 155°C motor winding temperature (ambient temperature plus motor heat rise).

# Options for Can-Stack: BlackIce™ Teflon® Coated Leadscrews



HaydonKerk Motion Solutions™ • www.HaydonKerk.com • Phone: 800.243.2715 • International: 203.756.7441

Sold & Serviced By:  
**ELECTROMATE**  
Toll Free Phone (877) SERV098  
Toll Free Fax (877) SERV099  
www.electromate.com  
sales@electromate.com



20000 Series, non-captive



26000 Series, non-captive



36000 Series, non-captive



46000 Series, non-captive

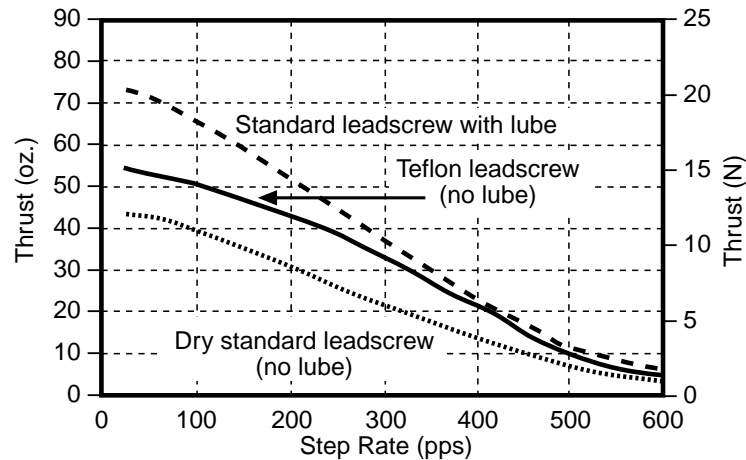
## Teflon® coated leadscrews for applications that require a permanent, dry lubricant

HaydonKerk Motion Solutions™ offers a Teflon® coated leadscrew option for its Can-Stack Series linear actuators. The use of a Teflon coated lead-screw allows for a “greaseless” screw and nut interface. This lead-screw option is ideal for applications where conventional oils and greases can not be used for lead-screw lubrication.

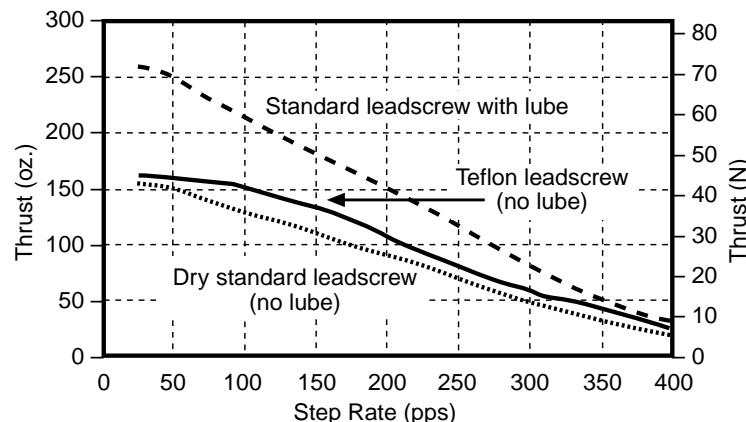
A non-lubricated Teflon coated lead-screw provides improved performance in both life and thrust as compared to a “dry” stainless steel lead-screw. Teflon can be applied to a wide variety of lead-screw pitches and is available for the Haydon™ captive, non-captive and external linear actuators.

The Teflon coated lead-screw is typically used for applications where contamination from grease or lubricants must be avoided, such as silicon wafer handling and clean room applications. Other applications include medical equipment, laboratory instrumentation or anywhere precise linear motion is required.

### Teflon® 26000 Series P/N T26542 • L/R Drive • 100% Duty Cycle



### Teflon® 36000 Series P/N T36441 • L/R Drive • 100% Duty Cycle



Teflon is a registered trademark of DuPont

## Home Position Switch

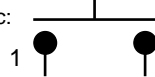
A miniature electronic home position switch capable of monitoring the home positions of linear actuators. The switch mounts on the rear sleeve of captive linear motors and allows the user to identify start, stop or home positions. Depending on your preference, contacts can be normally open or normally closed. The contact closure is repeatable to within one step position, identifying linear movements as low as 0.0005-in (0.0013 cm) per step. Multiple contact switches are also available.

The switch allows device manufacturers the ability to monitor movements more precisely for greater control and improved Q.C. When ordering motors with the home position switch, the part number should be preceded by an "S".



### Technical Data

Contact Ratings (Standard): 1.00 AMP @ 120 VAC  
1.00 AMP @ 28 VDC  
Operating Temperature: -30°C to +55°C (-22°F to 131°F)  
Contact Resistance: < 20 milliohms typ. initial at 2-4 V DC, 100 mA  
Electrical Life: Tested to 60,000 make-and-break cycles at full load  
Schematic:



3 Multiple contact options available.

## End of Stroke Proximity Sensor

The sensor incorporates a hall effect device, which is activated by a rare earth magnet embedded in the end of the internal screw. The compact profile of the sensor allows for installation in limited space applications.

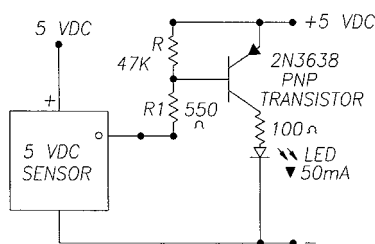
The sensor has virtually unlimited cycle life. Special cabling and connectors can also be provided.

### Technical Data

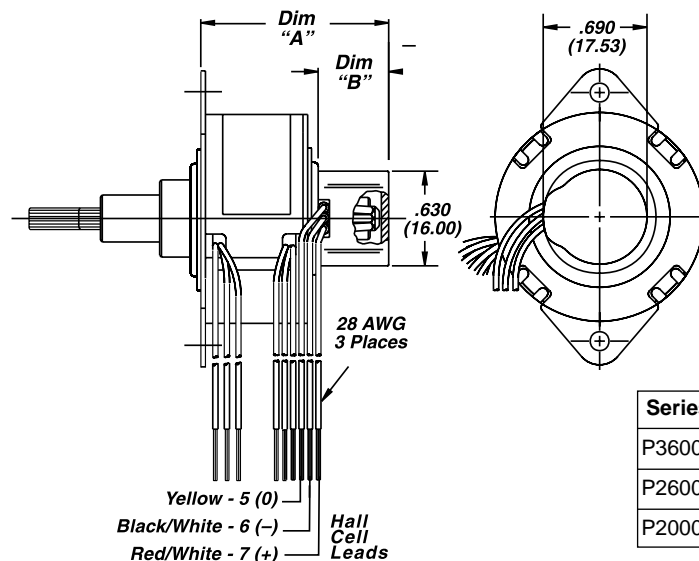
Supply Voltage (VDC): 3.8 min. to 24 max.  
Current consumption: 10 mA max.  
Output voltage (operated): 0.15 typ., 0.40 max.; Sinking 20 mA max.  
Output current: 20 mA max.  
Output leakage current (released): 10µA max. @  $V_{out} = 24$  VDC;  $V_{cc} = 24$  VDC  
Output switching time  
Rise, 10 to 90%: .05 µs typ., 1.5 µs max. @  $V_{cc} = 12$  V,  $R_L = 1.6$  KOhm  
Fall, 90 to 10%: .15 µs typ., 1.5 µs max. @  $C_L = 20$  pF



36000 series with end of stroke proximity sensor (without protective cap).



Note: Sensor is category 2 ESD sensitive per DOD-STD-1686A. Assembly operations should be performed at workstations with conductive tops and operators grounded.

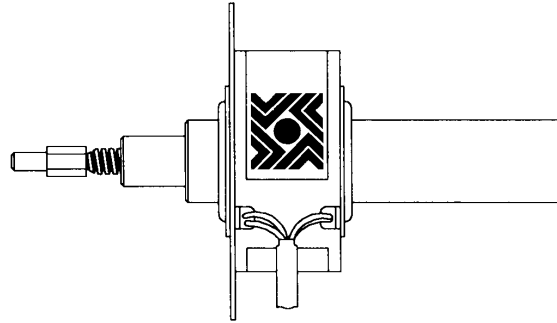


Series	Dim. "A"	Dim. "B"
P36000	1.220 (31.0)	.470 (12.0)
P26000	0.950 (24.13)	.370 (9.4)
P20000	1.120 (28.45)	.470 (12.0)

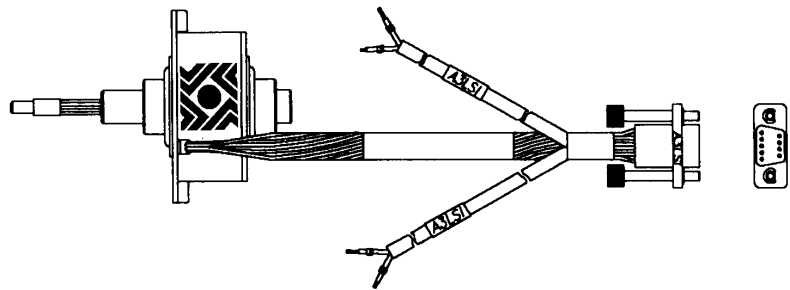
## Innovative designs that go beyond our standard lines

In addition to our standard linear actuators described in this catalog, HaydonKerk Motion Solutions™ offers an extensive range of custom configurations. The diversity of our customers' linear motor applications have required our engineering and manufacturing teams to develop custom configurations for today's most advanced technologies. The following examples illustrate some of the customized motors HaydonKerk Motion Solutions™ produces. If your application requires something not shown, give us a call and we will be happy to work with you to develop a custom solution.

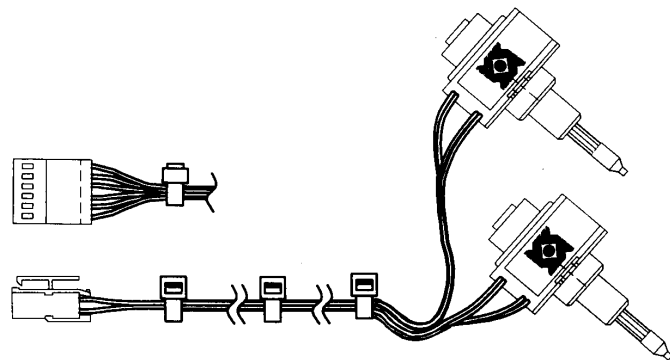
**Example No. 1**  
Rear shaft protection



**Example No. 2**  
Motor lead termination techniques



**Example No. 3**  
Sub-assembly/  
harnessing/  
motor termination



**Example No. 4**  
Threaded front  
sleeve without  
mounting flange.

